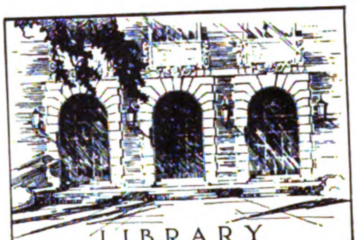

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THE WAR OFFICE

STATISTICAL REPORT ON THE HEALTH OF THE ARMY 1943-1945

LONDON: HIS MAJESTY'S STATIONERY OFFICE
1948

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STATISTICAL REPORT
ON THE
HEALTH OF THE ARMY
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By Command of the Army Council

Eric. B. B. Speed.

THE WAR OFFICE
20th August, 1948

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PART IX. PSYCHIATRY IN THE ARMY

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FOREWORD

By THE DIRECTOR-GENERAL · ARMY MEDICAL SERVICES

THE value to medical science of statistical information has long been realised by the military authorities, and the Army as a large closed community offers unique opportunities for the study of medical problems by statistical methods. It is hoped, therefore, that this Report will prove of interest and value.

The Report refers to the triennium 1943-45 only as it was impossible to produce comprehensive Army medical statistics during the first three years of the war. The difficulties were in the main that hospitals of the Emergency Medical Services, though treating a high proportion of military cases in the United Kingdom, did not come within the orbit of military medical documentation; also the interruption of overseas communications limited the statistical activities of the Army Medical Department to immediate necessities.

It was, however, practicable to introduce, by 1943, very much more complete arrangements with the result that the production of this Report has been possible. Unfortunately, it is to some extent incomplete as the final analysis of such material as is available in regard to BLA/BAOR and ALFSEA has not yet been completed and there must be considerable delay before this work can be done.

Under such circumstances and in view of the need to place in the hands of the Secretary of State and of the medical profession with as little delay as possible the extensive information already at our disposal, it was decided to proceed with the preparation and publication of the Report and to furnish at a later date such information as proves to be obtainable from the records of the two operational Commands referred to. As regards BLA/BAOR, however, the Report does in fact cover the battle casualties of the Normandy campaign during June/July 1944 (Part VIII) and statistics of venereal disease after V.E. day.

In more ways than one this publication signalises an advance on those the Army has hitherto produced and it is my belief that some of its more novel features will be of much benefit to medicine as a whole as well as to the Services.

It presents two classes of information for which civilian public health statistics lack the necessary demographic data. I refer especially to the contents of Parts IV and VI which respectively set forth the liability of stocks of different geographical origin to diseases alien to or endemic in their respective habitats, and Army experience of the relation of age to risk of disease with due regard to the true population at risk in a given year of life. Part XI records therapeutic trials on a scale which is rarely if ever practicable outside the Army; and if it raises—as scientific enquiry so often does raise—more problems than it solves, the peculiar difficulties on which it focuses attention clarify tasks which others may undertake with greater success.

As concerns the health of the Army itself, Parts I-III and X present a comprehensive picture of man-day wastage as a background to what are the priorities of research and preventive precautions from the Army viewpoint. Part IX draws attention to the magnitude of the psychiatric problems of modern Army medicine and presents a much needed record of the contribution made by Army psychiatry.

If the Report has little to say of those diseases which are of special interest to the epidemiologist, the sufficient explanation is that the advance of Army Hygiene between the last two major wars and its organisation in the war with which we are here concerned has relegated many major dangers of a past generation to the status of museum pieces. That there is so little to record of typhus, of schistosomiasis or of cholera is a circumstance on which Army medicine can reflect with gratification; and if the war has brought into focus the need for an attack on other fronts, the facts set forth in these pages should convince the public that Army medical authorities are resolute in their determination to prosecute with new vigour fresh campaigns on behalf of positive health and against ill-health with all the new weapons advancing biological knowledge places at their disposal.

N. Cantlie.

GLOSSARY

OF INDICES, ABBREVIATIONS, ETC. USED IN THIS REPORT

Designation	*Definition*
MEAN MONTHLY RATE (M.M.R.)	A rate, crude or otherwise (*vide infra*), adjusted to correspond with that for a month of *fixed length* (30·5 days) almost exactly equal to one-twelfth of a calendar year. This renders possible valid comparison between figures relating to calendar months, 4-weekly or 5-weekly periods. Annual totals can be obtained by the summation of 12 mean monthly rates. The M.M.R. is one-twelfth of the *Equivalent Annual Rate* for the same month.
CRUDE MEAN MONTHLY RATE (C.M.M.R.)	A Mean Monthly Rate which has *not been age-standardized*, *i.e.* one in which no allowance has been made for differences with respect to age composition of populations at risk.
POPULATION AT RISK	Number of individuals liable to incur a particular disease or disability.
ABSOLUTE INCIDENCE	Ratio of cases specified to population at risk.
ABSOLUTE INCIDENCE (I_x) (w.r.t. an age group)	If c_x is the number of cases in the xth age group and p_x is the corresponding strength, the absolute incidence I_x of the same age group is $c_x \div p_x$.
RELATIVE INCIDENCE (R_x) (w.r.t. an age group)	If T_1 is the sum of I_1, I_2............etc., $R_x = 100\ I_x \div T_1$. It is convenient for purposes of comparing the age distributions of different diseases or age distributions of the same diseases among males and females.
RELATIVE MORTALITY RATE	Percentage of deaths with a given diagnosis among deaths of all kinds or deaths of a specified class.
ABSOLUTE FATALITY RATE	Ratio of deaths to total cases of any given disease.
RELATIVE FATALITY RATE	An index of the relative lethality of different diseases.
RELATIVE SICK DISCHARGE RATE (R.S.D.R.)	Percentage of discharges with a given diagnosis among total *sick* (*diseased* as opposed to *injured*) discharges.
RELATIVE OVERALL DISCHARGE RATE (R.O.D.R.)	Percentage of discharges of the type specified among *total* discharges.
RELATIVE MORBIDITY RATE (R.M.R.)	Percentage of cases with a given diagnosis among total *sick* (*diseased* as opposed to *injured*) cases during a given period.
RELATIVE CASUALTY RATE (R.C.R.)	Percentage of casualties of a given specification among *all* cases in a given period, including injuries in addition to *sick* in the more restricted sense signified above.
RELATIVE WASTAGE RATE (R.W.R.)	The *proportionate contribution* each type of casualty makes to total days spent in medical units specified by casualties of *all* kinds or by casualties of a particular class.
RELATIVE DURATION OF STAY (R.D.S.)	The Mean Duration of Stay (M.D.S.) in medical units specified for any particular type of casualty expressed as a fraction of the M.D.S. for all casualties or for casualties of a larger class.

Designation	*Description*
COMPARATIVE MORBIDITY RATE	The incidence of a given disease expressed as a percentage of the incidence of the same disease in a standard population, here usually taken as British Army troops.
CRUDE PREGNANCY RATE	Number of pregnancies occurring among a given number of women during a given period, without reference to age composition or to the proportion of married women in the population at risk.
NUPTIALITY RATIO	Proportion of married to total A.T.S.
NUPTIAL STANDARDIZED PREGNANCY RATE (N.S.P.R.)	A pregnancy rate adjusted to offset changes due solely to variations with respect to the proportion of married A.T.S. as opposed to real changes of the fertility level.
STANDARDIZED PREGNANCY RATE	Pregnancy rate calculated on basis of prevailing fertility rates for married and single women referred to a standard population of fixed age composition either separately or combined in a fixed proportion by reference to a standard population with a fixed nuptiality ratio.
GROSS PREGNANCY RATE (G.P.R.)	Half the total number of pregnancies per woman throughout the period of potential parenthood at the prevailing fertility rates in each year of life, being therefore what the mean number of live female offspring born to a female throughout her reproductive life would be at current fertility rates if there were no miscarriages or stillbirths.
E.A.	Due to enemy action.
N.E.A.	Not due to enemy action.
R.T.U.	Returned to Unit (*i.e.* to duty).
E.M.S.	Emergency Medical Services.
w.r.t.	With respect to.
I.A.T.	Inflammation of areolar tissue.
V.D.H.	Valvular disease of the heart.
E.N.T.	Ear, nose and throat.
M.T.G.	Mouth, teeth and gums.
I.D.K.	Internal derangement of the knee.
P.U.O.	Pyrexia of uncertain origin.
MALARIA B.T.	Malaria—benign tertian.
,, M.T.	Malaria—malignant tertian.
,, Q.	Malaria—quartan.
S (....)	*Total* of all items of the sort specified by the symbol within the brackets.
STANDARD ERROR (S.E.)	A measure of deviation attributable to sampling. The true value of a percentage derived from a sample is likely to lie within limits defined by twice the S.E. above or below the recorded value.
STANDARD ERROR OF DIFFERENCE	A difference between two sets of observations is normally taken to be significant when the observed difference is greater than twice its Standard Error.
COEFFICIENT OF VARIATION (C. OF V.)	A measure of the dispersion from the mean of a series of variables, expressed as a percentage of the mean.

INTRODUCTION

by

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THE issue of this report is a fitting occasion to survey the contribution of the Royal Army Medical Corps to increasing recognition of the value of statistical enquiry to medicine as a whole. The clinical impressions of military physicians had their first notable impact on English medicine during the wars of the 18th century. First, and best known of them, was Sir John Pringle, physician general to the British forces in the Flanders campaigns of 1742-3. What his work *On the Diseases of the Army*, published in 1752, did to bring to the fore the association between dirt and disease, and in particular to focus attention on the identity of hospital fever, gaol fever and other homonyms for a single entity is familiar to all of us. Simon (*History of English Sanitary Institutions*, 1897) sums up his contribution in these words :

> " With his plain peremptory insistence on common health necessities for the soldier . . . with his excellent directions against damp and filth in camps, and for the ' right management of the air ' in hospitals, he began hygienic reform for the British Army and gave at the same time most valuable hints to the civil population how likewise their typhus and their enteric infections might be prevented."

The work of Pringle, who nowhere attempts quantitative assessments, derives its value from his clinical acuity. During the Seven Years' War, Munro repeated observations Pringle had himself begun in the War of the Austrian Succession ; and an innovation due to his action is the first milestone in the history of Army Medical Statistics. In an *Account of the Diseases which were most frequent in British Military Hospitals in Germany from* 1761-1763, published in 1764, he reprinted a series of orders for differing grades of military medical personnel. Though they make no explicit reference in them to any statistical records as such, they mention the inauguration of hospital admission and discharge books to become later the basic documents from which hospitalization returns were filled in. This comes in the *Orders for Surgeon's Mates* :

> " That every Mate have a Book for writing the Prescriptions of the Physicians in which is to be kept in the following order : First, to mark the Patient's name and regiment ; then the day of his entry into Hospital and his Disorder ; then the Prescriptions of the Physician ; and, after all, the Day of his Discharge or of his Death."

From these beginnings, a long period of wars, first in America and then with France, furnished experience for the introduction of returns designed to assess wastage to the Army through death. An extensive system of such returns was introduced by Sir James McGrigor, who became Inspector-General of Hospitals at the end of the Peninsular war ; but for twenty years they continued to be domestic accounts private to the files of the Secretary-at-War. The first person to realise their potentialities seems to have been Tulloch, then Captain and subsequently Major-General. From the beginning of his service Tulloch interested himself in Army reform. While serving in India in the twenties, he had started to investigate sources of mortality figures then available. On his return to England, he became friendly with John Narrien, then Professor of Mathematics at the Royal Military College ; and the acquaintance seems to have canalised Tulloch's reforming zeal along new lines. At the time, Army pensions were the focus of lively attention. In so far as it involved other ranks, this concern was *en rapport* with contemporary public interest in social security synchronising with new poor law legislation. As it affected officers, it impinged on the prevailing system of purchasing commissions, a practice interlocking with the Regency boom in upper class gambling. Army officers were largely recruited from younger sons of landowning families ; and their finances in an age of patronage were as notoriously speculative as the finances of ministers of state. Those of Greville, the diarist, are sufficiently illustrative. At the age of seven, Charles Greville was made Secretary of the Island of Jamaica. At ten he was made a Clerk Extra-ordinary to the Privy Council. Each of these jobs was a sinecure, the salaries from which (about £2,000 p.a. apiece) he could receive only after the death of the incumbent. The Clerkship to the Privy Council became vacant in 1821 when Greville was 27, the Governorship when he was 35, prior to which time he maintained himself as a man-about-town by borrowing on his reversionary interests as security.

Tulloch seems to have been one of the first to realise that gambling on reversionary interests in commissions can be reduced to rule of thumb by means of life tables, already an accepted accounting device of commercial life insurance. In 1835 he published two articles in the United Services Journal, one on *Calculation of the Value of Military Pensions* and the other on *Mortality among Officers of the British Army*. In the first he remarks :

> " It is surprising, when the subject of military pensions has so often engaged the attention of Parliament, that some investigation has not been ordered into the principles on which their value depends, instead of trusting to mere conjectures which, when acted upon, have been discovered to be far wide of the truth . . . The value of any annuity or pension is, of course, dependent on the number of years its possessor is likely to enjoy it. Now, though nothing can be more uncertain than the duration of life in individual cases, still nothing is more certain when taken in the aggregate, and accordingly tables of mortality have been framed, on much less extensive data than might be obtained in the Army, by means of which the probable duration of life of any particular age may be calculated almost to a fraction, and thus the value of annuities as well as of contingent and reversionary life interests is easily ascertained."

In the other article Tulloch says :

> " . . . To the seniors of each rank, it is no less interesting than useful to be thus enabled to ascertain the probability of attaining their promotion by death vacancies, ere they expend their money in purchasing. . . . If, as we stated in a former article, it was difficult, if not impossible, to legislate with any degree of accuracy on the subject of soldiers' pensions, without a strict reference to the rate of mortality among that class of individuals, both prior and subsequent to their being admitted to the outpension list, it is not less difficult, no less impossible, to lay down regulations either for the promotion or retirement of officers, without first ascertaining the mortality to which they are subject, as well when employed upon active service, as after their retirement on half-pay."

In their immediate context these articles did little to influence the policy with respect to Army pensions. When a Royal Commission was appointed in 1840 under the chairmanship of the Duke of Wellington to enquire into the methods of Promotion and Retirement in the Army and Navy,(1) Tulloch was not called on to give evidence ; and there is no reference to the actuarial considerations he had propounded in the evidence to, or in the findings of, the Commission. By this time, however, Tulloch's own interests had broadened. He was now engaged on the production of the first officially published Army Medical Statistics.

(1) Report of the Commissioners for enquiring into Naval and Military Promotion and Retirement, H.M.S.O. 1840.

While the articles cited above had passed unnoticed by the soldierly eye of Wellington, they had made contact with the civilian outlook of Gray, then Secretary-at-War. The immediate occasion was an enquiry into colonial expenditure. As a result of it, there was need for information with regard to expense incurred in replacing soldiers who died or were invalided. To provide part of this information, and to see generally what could be derived from Army Medical Statistics, Tulloch now with the rank of Major was appointed to investigate rates of sickness, mortality and invaliding in the Army and to report on the subject to Parliament. On his first appointment, he was instructed to work with Marshall, then Inspector-General of Hospitals; and did so for one year. In 1836 Marshall retired and Tulloch had as his assistant a young medical officer called Thomas Balfour. This was the year before the creation of the *General Register Office* provided for the first time machinery for public health statistics of the civil community. With Balfour, Tulloch was to collaborate for the next quarter of a century. The initial results of their partnership were published in a series of Parliamentary papers between 1838 and 1841. The first report was also condensed by Tulloch and given in 1838 as a paper to the newly founded *Royal Statistical Society*.[1]

The *Parliamentary papers* deal in turn with each of the major stations where British garrisons were held.[2] Their aim was explicitly to examine differences with respect to health of troops exposed to different climatic environments. To this end they begin with a report on the geographical position, physical aspect, climate, temperature, rain, winds, etc., of the places concerned, a practice that long survived both in Army hygiene reports and in the official format for Medical and Sanitary Reports from British Colonies.[3] The comparative intention of the papers is well brought out in the first sentence of the report on *Troops at Home*:

> "Before a just estimate can be formed of the influence of different climates on the health of troops abroad, it is requisite to ascertain the degree of Sickness and Mortality to which they are liable in their native country."[4]

As an instance of perspicacity rare at the time, the following remarks are also worthy of citation:

> "To obtain correct results, however, in regard to the influence of climate on the health of any body of men, it is not only essential that they should have been continuously resident in this kingdom during the period over which the observations extend, but that they should not have been recently serving in stations where their health was likely to have been deteriorated, otherwise the effect of disease contracted in another climate might have been attributed to that of the United Kingdom."[5]

Tulloch took the precaution of citing separate statistics of regiments that had been stationed permanently at home. As yardsticks of health the reports concern themselves with admissions to hospital, invaliding and deaths. Tulloch and Balfour did not themselves undertake to assess the influence of age on morbidity, a problem for the elucidation of which Army medical statistics, being the only ones with ostensibly complete records of sickness, are peculiarly fitted; but they devote a section to the evaluation of the influence of age on the mortality of troops by determining separately ratios of deaths per thousand living for five different age groups. The possibility of devising a limited life table concerned only with the limited age range of the Army itself does not explicitly emerge; and a technique of standardising mortality rates by reference to a fixed population was not as yet available.

This series of reports have a peculiar interest, if only because they rank among the earliest British official vital statistics. For the armed services, they were certainly the earliest to be published in any country. The first volume of statistical reports on the health of the British Navy appeared in 1840 and the first on the Army of the United States in 1842. Other European nations followed suit during the 19th century, the Italians, for example, in 1876, and the Prussians in 1880. Impressed with the results of the British experiment, the French had already started a statistical study on the condition of army horses in 1847, but did not extend their investigations to the health of their human commensals until 1864.[6]

Tulloch and Balfour were not merely concerned to assess the health of the troops as an academic exercise. As Balfour explained at a later date, the zeal which urged them to their statistical investigations was a reforming one:

> "With each of these reports we drew up a precis of the measures which appeared to be necessary, or likely to improve the health of the troops. Although it was not deemed advisable by the authorities to publish these recommendations in our reports, many of them were carried into effect, with marked benefit to the health of the soldier, but others were neglected or put off until a more convenient season on account of the expense they would have incurred."[7]

Meanwhile, there was progress in the pedestrian, but none the less essential, administrative problems of collecting the raw materials. According to Balfour:

> "At the end of the first volume we prepared a form of sanitary report to be forwarded annually to the Secretary-at-War, through the military authorities by the principal medical officer on each foreign station. In this manner some of the defects of the original medical returns were remedied, especially as regards the strength of the troops, the number daily sick in hospital and the omission of deaths which occurred out of hospital."[8]

Profiting by previous experience, Tulloch and Balfour began to compile a second series of reports in 1848. Ten volumes appeared before the Crimean war interrupted the project. Cabinet crises and administrative reorganization resulting from exposure of inefficiency during the Crimea are a well-thumbed brief, as is the public outcry against insanitary hospital conditions dramatically publicized by Florence Nightingale; but their impact on Army medical statistics is less familiar. The Royal Commission on *Regulations affecting the Sanitary Condition of the Army* in a report which framed far-reaching changes, also commented favourably on the need for an efficient statistical service. The uses to which Simon and Chadwick had put Farr's data supplied by the Registrar General's office were now popular. Panmure, the Secretary-at-War in 1857, therefore set up a small committee consisting of Sidney Herbert, Tulloch (by this time Colonel Sir Alexander Tulloch, K.C.B.) and Farr himself. Their report,[9] published in 1861, defined the main lines of subsequent statistical policy in the Army Medical Services. The Commissioners, in no doubt about the value of statistics,

(1) *Jour. Roy. Stat. Soc.* 1838, Vol. I, p. 129 *et seq.*

(2) These were: West Indies (1838), The United Kingdom, The Mediterranean and British America (1839), West Africa, St. Helena, Cape of Good Hope and Mauritius (1840), Ceylon, Tenasserim and the Burmese Empire (1841). For references see Military Parliamentary Papers for the years quoted.

(3) See *e.g. Tropical Diseases Bulletin*, Vol. 43, 1946, Supplement on Medical and Sanitary Reports from British Colonies.

(4) Statistical Report on the Sickness, Mortality and Invaliding among the Troops serving in the United Kingdom, H.M.S.O. 1838, p. 3.

(5) *Ibid.*, p. 3.

(6) T. G. Balfour: Vital Statistics of Cavalry Horses, *Jour. Roy. Stat. Soc.* Vol. 43, p. 251 *et seq.*

(7) T. G. Balfour: Presidential Address to the *Roy. Stat. Soc.*, 1889, Vol. 52, p. 517.

(8) *Ibid.*

(9) Report of the Committee on the Preparation of Army Medical Statistics and on the Duties to be Performed by the Statistical Branch of the Army Medical Department, Parliamentary Papers, 21 June, 1861.

either to the progress of medical science in general, or for the internal sanitary control of the army, assert their belief:

> "Reports exhibiting the results of extensive observations over a wide field will serve to measure the influence of each known cause on health; and will probably lead to the discovery of the new causes, both of impaired and of vigorous life. They will every year contain new contributions to the science of health, in which the whole nation is concerned."(1)

Elsewhere they state:

> "The medical officers of the Army will learn from the reports the prevailing diseases against which they have to guard. They will be able to compare the cases in their own and other regiments. By observing the development of pathological phenomena, in bodies of men under every variety of circumstances, they will accumulate the materials for induction, and will teach us to distinguish causes from coincidences."(2)

Nor do they overstate the claims of Army Medical Statistics, when they declare:

> "A good system of reports will enable the Army Medical Department to develop all its energies and to distinguish itself by sanitary discoveries which will increase the efficiency of Her Majesty's Army, advance science, and be beneficial to mankind."(3)

To achieve this object they devised a system of returns, advocated the setting up of a Central Statistical Branch of the Army Medical Department, and laid down its terms of reference, including a list of specific tables to be included in its Annual Report. Information was required to develop the general vital statistics of the Army with a view to estimating major sources of wastages, to clarify associations suggestive of the influence of environmental agencies relevant to the aetiology of individual diseases; and to clarify "the effects of treatment on the fatality and on the duration of diseases."(4) The recommendations of the Commissioners were accepted; and Balfour, now a Fellow of the Royal Society, was appointed head of the new Statistical Branch with the rank of Deputy Inspector-General. The first report, relating to the year 1859, was published with the report of the Commission in 1861.(5) Except during the years 1915-20 the reports continued to be published annually until 1939, when they were suspended on the outbreak of war.

Unavoidably, the system initiated by Tulloch and Balfour had one drawback. It was conceived in terms of the Colonial wars and police activities of a 19th century army. As pointed out in *The Official History* of the 1914-18 war, it made no provision for large-scale wars that came later:

> "Prior to August 1914 no scheme had been drawn up for the collection of complete medical statistics in war, although it was realised that the peace-time system, with its complicated monthly and annual returns, would be much too elaborate for the purpose. It was apparently intended to follow the method adopted for the South African war, which was to extract the statistics from the admission and discharge books after the termination of hostilities."

Between the two major wars of this century there was no action to remedy this shortcoming, nor did the pursuit of statistical information fulfil the high hopes which so promising a start had encouraged. Neither personnel then available in the Army itself nor existing administrative machinery was adequate to the task. When a new statistical branch was set up under D.G.A.M.S. by a decision of the Army Council at an early stage in the second World War, its immediate and inescapably main preoccupation was to subserve War Office commitments to the Ministry of Pensions and to supply information with respect to hospital accommodation in a totally novel situation resulting from the creation of an Emergency Medical Service. Initially, the E.M.S. had no obligation to conform to the Army system of medical documentation, nor did it at all times conform strictly to War Office requirements w.r.t. rendition of records. The War Office statistical unit originally set up to deal with so chaotic a situation was inevitably understaffed, severely hampered in its work by enemy action, limited in scope because allocated to a branch primarily responsible for administrative arrangements w.r.t. hospital accommodation and hence with no official concern to probe the larger issues Tulloch and Balfour had envisaged with singular penetration eighty years earlier. When the danger of invasion had receded and conditions were more favourable to generous provision for medical statistics, D.G.A.M.S. was free to deal with these inadequacies, and initiated an enquiry with a view to providing more satisfactory machinery. As a temporary expedient, Army Medical Statistics became the responsibility of the separate war-time Directorate of Biological Research under Brigadier F. A. E. Crew, F.R.S., afterwards Directorate of Medical (Statistical) Research (D.M.(S.)R.) with greatly enlarged resources of qualified officers. The salvage of materials for the preparation of this report was an outcome of the change. *Pari passu* with work on its production, there has been an overhaul of medical documentation to secure more complete, more reliable, and more accessible records, with a view to comprehensive analysis of medical wastage and satisfactory conduct of therapeutic trials. The healthy growth of medical statistics in the interests of the post-war army, as of the nation as a whole, is assured by provision for the continuance of the work of the war-time D.M.(S.)R. as a branch of the Directorate of Hygiene with a permanent nucleus of expert personnel.

Such a statistical machine, subserving the purposes of an all-in system of social medicine, can provide materials for the exploration of fundamental problems of medical science and can be an asset to the nation as a whole. The creation of a national health service, which will doubtless enlarge the scope and opportunities for more widespread use of statistical controls in medical research, will also demand solution of administrative problems for the solution of which Army experience may well serve as a preview and as a model. If Army medical authorities have been modestly reticent concerning the national value of the task which the labours of Tulloch and Balfour initiated, contemporary comment of the civilian pioneers of English Vital Statistics bears eloquent testimony to its impact on their own work. In 1872 Farr, who as first superintendent of the Statistical branch of the General Register office ranks as the father of public health statistics in his own country, stated as his goal (*35th Annual Report of the Registrar-General*): "the thing to aim at ultimately is a return of the cases of sickness as complete as is now procured from the Army in England."

Writing in 1885 (On the Evils of Disunity in Central and Local Administration) about investigations that he had himself done some thirty years earlier, Chadwick states:

> "At the commencement of my investigation, as to the means of preventing excessive sickness and premature morbidity among the civil population I was perplexed by the uncertainties incident to reasonings from small groups of cases of different ages, occupations and conditions, and I found it necessary to look especially to the diseases prevalent amongst persons of like ages and conditions, as to places, lodging, food, clothing, occupations and climates, amongst whom the operations of common causes would be more clearly distinguished and recorded: that is to say, amongst the army and the navy."

If it was clear to Farr and Chadwick that efficient and comprehensive army medical statistics are a national investment of no mean value, it is surely more clear to us on the threshold of a new National Health policy and

(1) Report cited in footnote (9) of p. viii; p. 42.
(2) *Ibid.*, p. 47.
(3) *Ibid.*, p. 48.
(4) *Ibid.*, p. 35.
(5) Statistical, Medical and Sanitary Report of the Army Medical Department for the year 1859. H.M.S.O., 1861.

increasing alertness to wider responsibilities on behalf of the Colonial populations for whose health the nation is trustee. For this reason it is not out of place to put on record conclusions which have emerged from the common experience of those privileged to participate in the task before us, experience enriched by the very nature of the difficulties besetting its accomplishment and by full recognition of the unavoidable shortcomings of the outcome.

It is a belief equally common among clinicians and statisticians that the technique of observation and its correct interpretation are each specialities capable of fulfilling their proper ends, if there are opportunities for contact between those who practise them. Daily difficulties which emerge in the exploitation of Army medical statistics abundantly demonstrate the pitfalls of such collaboration in the absence of mutual understanding of the contribution each can make. Such pitfalls are the greater, if the common link between the practising clinician or surgeon on the one hand and the analytical statistician on the other is an isolated administrative unit charged with the specialised, if seemingly pedestrian task of supervising the issue and custody of documents embodying the basic data of a statistical enquiry. Since the requirements of both administration and research are liable to change, a system of documentation and disposal of records ideally designed to furnish relevant data for the solution of problems of major importance at one stage inescapably falls short of later requirements, unless constantly adapted thereto. Two reflections thus prompted by the experience of which this report is the outcome are:

(i) how easily analysis of data can be prejudiced by insufficient acquaintance with limitations inherent in design, rendition and extraction of relevant information from basic documents, if the statistician works in a consultative capacity out of day-to-day contact with the machinery for issue and assembly of documentary material;

(ii) how greatly the output of such machinery may fall short of its potential usefulness unless constantly adapted to new needs in the light of conference between clinicians who appreciate the scope for profitable application of statistical procedures and statisticians alert to the biological significance of their subject matter.

In short, the proper conduct of a unit charged with responsibility for Army Medical Statistics presupposes an establishment which brings into one and the same organizational context, a composite appreciation of all the interconnected issues—biological, analytical and administrative—which arise therein.

Part I. TOTAL WASTAGE

§1 DISCHARGES FROM THE ARMY ON MEDICAL GROUNDS 1943-1945

THE following considerations w.r.t. documentary sources and the basis of compilation of ensuing tables are relevant to a proper appreciation of information contained in this Section.

(*a*) Basic data come from A.F.B. 3978, completed by the president of a medical board for each case placed in Category E. Other ranks placed in this category are forthwith discharged from the Army on medical grounds. Medical discharge in Category C of men and women for whom no suitable employment could be found was authorized at the end of 1944. Accordingly 1945 figures include such cases as well as those placed in Category E.

(*b*) Since there is a slight leakage of forms *en route* to the War Office, totals based thereon are adjusted with reference to overall medical wastage figures from another source, before calculating *absolute* rates per 100,000 strength (Tables 2 and 4). This accounts for an apparent drop during the second half of 1944, when there was an administrative change of the method of compiling total discharge figures.

(*c*) Although all discharges here included took place in the U.K., the true population at risk is the total strength of the Army, since no soldier can be medically discharged overseas. He can be returned to the U.K. only with a recommendation for a medical board. Accordingly, rates cited apply to the whole Army and not to soldiers in the U.K. alone.

(*d*) The first two years of the period covered (1943-1944) are especially instructive since they precede the introduction of medical discharge of soldiers of low category for whom no suitable employment is available. Such soldiers are not placed in Category E (permanently unfit for service) and are not therefore medically discharged in the full sense of the term. Inclusion of Category C discharges, as also of a considerable number of ex-prisoners of war, in 1945 makes comparison between this year and earlier ones of limited value. Furthermore, the end of the war against Germany (May, 1945) and Japan (August, 1945) is likely to have influenced standards adopted by medical boards. Consequently what follows deals mainly with the two years 1943 and 1944.

(*e*) Figures cited do *not* include A.T.S. discharges w.r.t. *Pregnancy*. These appear in a separate section (§ 3).

(*f*) Tables 1-5 deal only with *Other Ranks*. Officers are excluded because both medical criteria and administrative procedure applicable to them differ materially from those relating to other ranks.

(*g*) *Relative Sick Discharge Rates* (R.S.D.R.) in ensuing tables cite the percentage of discharges with a given diagnosis among total discharges w.r.t. *disease*. *Relative Overall Discharge Rates* (R.O.D.R.) cite the percentage of discharges of the type specified among *total* medical discharges, *i.e.*, discharges w.r.t. both sickness and injury. What appear as *crude* rates in Tables 1-7 and elsewhere are *not* standardized w.r.t. age. For the significance of age differences, *see* Part VI.

(*h*) The term *military*, as here used in contradistinction to auxiliaries (A.T.S.), signifies *male* personnel only.

Medical Discharge : Military Other Ranks

Comparison of *crude* rates, *viz.* rates which make no allowance for differences w.r.t. age structure of populations at risk, can be most misleading. Changes of age composition both among military personnel and among A.T.S. were, however, relatively small during the period covered by this Section, hence comparison of crude rates w.r.t. males or females *separately* during the six-monthly periods shown does not involve serious error.

The salient feature of Table 1 and Chart 1 is that PSYCHIATRIC DISORDERS are by far the largest cause of medical discharge among military personnel (O.Rs.). In 1943 they made up over *one-third* of all discharges w.r.t. *disease*, and in 1944 their contribution rose to *two-fifths*. ANXIETY NEUROSIS makes up about half of all Psychiatric Disorders. Its relative contribution rose steadily throughout the three years 1943-1945. Next to Psychiatric Disorders the largest item is PEPTIC ULCER, which accounted for 13% of all sick discharges in 1943, but its contribution fell substantially in later years. Following in the scale come TUBERCULOSIS (6%-7% in 1943 and 1944) and BRONCHITIS (5%). Although discharges attributable to BATTLE CASUALTIES had been rising steadily, they made up only one-seventh of all medical discharges at the end of 1944 and no more than a fifth in 1945. ACCIDENTAL INJURIES contributed 6%, and DISEASES averaged about 80% over the three-year period. Discharges w.r.t. disease alone accounted for slightly less than 2% *of total military strength* in 1943 and slightly more than 2% in 1944. Accidental injuries involved a loss of a further 0·15% of strength in each of these two years. Considerations relevant to the specification of groups of diseases in the tables of this Section will be found in Part II, §1

The number of Category C discharges in 1945 was not so large as to cause spectacular changes of relative rates in that year. Inclusion of such cases, however, did tend to reduce the contribution of items such as Tuberculosis and Peptic Ulcer and to raise relative rates w.r.t. *Bronchitis*, *Otitis Media* and *Deformities of Foot*. Table 5 and Chart 2 show comparable distributions of " E " and " C " discharges in early 1945.

Medical Discharge : A.T.S. Other Ranks

As stated above, discharges w.r.t. *Pregnancy* do not appear in this section. Such discharges were four times as numerous as invalidings in 1944. As among males, PSYCHIATRIC DISORDERS are the main cause (Table 3) of medical discharge of female personnel from the service: indeed, they make up almost *one-half* of the total. The two main types of Psychiatric Disorders are ANXIETY

NEUROSIS and HYSTERIA. Together, they accounted for *two-thirds* of the psychiatric total of 1944 and for an even higher proportion in 1945. A fall of the rate w.r.t. *Mental Deficiency* is at least partly due to the exclusion of S.G.5s (lowest army intelligence grading) from A.T.S. intakes. Apart from Psychiatric Disorders, TUBERCULOSIS is the only large contributor to A.T.S. medical discharges. It makes up about 10%. Both *Accidental Injuries* and *Battle Casualties* are negligible among personnel of the A.T.S. *Absolute* discharge rates w.r.t. disease were almost identical for males and females in 1943 and 1944, *viz.* 2% of strength annually. A.T.S. figures for 1945 are less influenced by Category C discharges than corresponding military figures because the proportion of such cases was only 7% of total medical discharges as compared with 18% for males.

Separate statistics of medical discharges w.r.t. Q.A.I.M.N.S. in 1944 compiled on a somewhat different basis (Tables 6-7) disclose a considerably higher relative rate w.r.t. *Tuberculosis* than that of officers of the A.T.S. and a lower rate w.r.t. *Psychiatric Disorders*. As regards other conditions cited in Tables 6-7, it is pertinent to remark that they refer to a relatively small population and are subject to variation on that account.

Sex Differentials

While it is true that comparison of crude rates for successive periods in the two years 1943 and 1944 with reference either to military personnel *alone* or to A.T.S. *alone* involves no considerable error w.r.t. changes of age composition, Sex Differentials based on such rates would be highly misleading for a reason dealt with more fully in Part VI, *viz.*, that the male population at risk is a much older one than the female. With regard to sex differences revealed by crude discharge rates, it is indeed important to take stock of two considerations:

(*a*) differences disclosed by crude figures may arise largely or wholly through differences w.r.t. age composition of the populations at risk;

(*b*) differences disclosed either by crude figures or by figures standardized to eliminate the effects of age alone, may arise through application by medical boards of different standards to men and women.

No *general* formula is a safeguard against failure to discriminate between a *biological* sex differential, i.e. one which arises from inherent sex differences, and an *administrative* sex differential as defined in (*b*) above. On the other hand, it may be possible to do so with some confidence: (i) if the disease is one which would in any case justify a recommendation for discharge, *e.g.*, Tuberculosis; (ii) if the sex with the low discharge rate is presumptively more liable to be assessed with leniency, *e.g.* Peptic Ulcer.

Table 8 (*see also* Chart 3) shows annual *age-standardized* rates for males and females w.r.t. certain major diseases in 1943 and 1944, the standard population being that of military other ranks in 1940. A further column shows the Sex Differential based on these rates. For comparative purposes, the Sex Differential based on *crude* rates appears by its side. Standardization accentuates certain differences, diminishes others, and reveals some concealed by the crude figures. In terms of crude rates, discharge for ANXIETY NEUROSIS is only slightly higher among A.T.S.; but standardization discloses an A.T.S. rate over twice as high as the corresponding military figure. Standardized discharges for HYSTERIA are also twice as high among females as among males. For 1943 the standardized differential with respect to MENTAL DEFICIENCY was 1·4. In 1944 it was 0·7. This is probably due to a circumstance already mentioned, namely, exclusion of S.G.5s from A.T.S. intakes. The standardized rate with respect to MANIC DEPRESSIVE PSYCHOSIS is between 3½ (1943) and 4½ (1944) times as high among A.T.S. as among military. These are much higher than ratios suggested by unstandardized figures. In contradistinction to such *accentuation* of differentials suggested by crude figures, Table 8 shows several examples of attenuation. Most outstanding of these is PEPTIC ULCER, for which crude female and male rates are in the ratio 1 : 7, whereas the corresponding ratio of standardized figures is 2 : 7. Even so, the residual differential is striking. Standardization changes the A.T.S. BRONCHITIS rate in 1944 from ⅓ to nearly ⅗ of the male figure. Whereas the crude A.T.S. discharge rate with respect to PULMONARY T.B. was nearly 1½ times that of military personnel (1944), standardization reduces it to a level not greatly above the male rate. Standardization eliminates the whole of the A.T.S. excess suggested by crude figures w.r.t EPILEPSY.

Summary

The salient features disclosed by Tables 1-8 and Charts 1-3 are as follows:

(*a*) In 1943 and 1944 PSYCHIATRIC DISORDERS accounted for between one-third and two-fifths of all discharges with respect to disease among military personnel (O.Rs.). PEPTIC ULCER, TUBERCULOSIS and BRONCHITIS together contributed more than one-fifth. The four categories of disease taken together made up about 60% of the total.

(*b*) PSYCHIATRIC DISORDERS and TUBERCULOSIS alone account for about 60% of discharges w.r.t. disease in the A.T.S.

(*c*) *Disease*, as opposed to Injuries, accounted for more than 85% of *all* medical discharges among males in 1943, and more than 80% in 1944.

(*d*) Discharge w.r.t. *Disease alone* represented an *annual loss of* 2% *of total strength* for both military and A.T.S. in 1943 and 1944.

(*e*) Age-standardization accentuates certain sex-differences and reduces others. *Anxiety Neurosis* is the most striking example of the former, and *Peptic Ulcer* of the latter.

TABLE 1

Crude Relative Discharge Rates ; Military Other Ranks ; 1943-1945

(a) INDIVIDUAL DISEASES (expressed as R.S.D.Rs.)	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Psychiatric Disorders :						
Anxiety Neurosis	12·6	14·6	18·0	18·9	19·8	23·7
Hysteria	7·5	6·9	8·4	7·9	7·5	5·5
Psychopathic Personality	6·1	5·9	6·4	6·6	5·6	4·0
Mental Deficiency	2·3	2·5	2·8	2·3	2·1	1·7
Schizophrenia	2·1	2·4	2·6	2·6	1·8	1·9
Manic Depressive Psychosis	2·1	2·3	1·5	1·4	0·8	0·9
All Others	1·3	1·1	0·7	0·7	0·7	0·9
All Psychiatric Disorders	34·0	35·7	40·4	40·5	38·4	38·6
Peptic Ulcer	13·7	12·1	10·4	9·8	9·7	7·3
Bronchitis	4·5	5·2	5·1	5·0	6·1	4·3
T.B. Pulmonary	5·7	5·5	5·8	5·8	4·7	3·9
T.B. Other	1·0	1·2	0·9	0·8	0·6	0·6
Otitis Media	3·0	2·8	2·4	2·6	3·4	4·8
Rheumatic Conditions (excl. Rheumatic Fever) :						
Articular	2·2	2·4	2·1	2·1	2·0	1·5
Non-Articular	0·6	0·7	0·6	0·6	1·1	0·9
Epilepsy	2·8	2·3	2·1	2·0	1·5	1·1
Deformities of Foot	1·4	1·3	1·0	1·0	2·0	2·1
Asthma	1·1	1·3	0·8	1·4	1·1	1·3
Synovitis and Arthritis	1·0	1·1	1·0	1·0	1·1	1·2
Sciatica	0·9	0·9	1·2	1·0	1·1	1·3
Neoplasm : Malignant	0·7	0·8	0·6	0·7	0·5	0·5
Benign and Unspecified	0·3	0·2	0·2	0·3	0·3	0·2
All Other Diseases	27·1	26·5	25·4	25·4	26·5	30·3
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0

(b) SPECIALIST GROUPS (expressed as R.O.D.Rs.)	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
All Psychiatric Disorders	30·4	30·3	33·2	32·1	27·5	29·5
All Diseases of E.N.T. (incl. *all* Deafness)	4·7	4·2	3·6	3·5	3·6	5·4
All Diseases of Skin	2·6	3·0	3·4	3·3	3·7	4·1
All Diseases of Eye	2·4	2·0	1·6	1·5	1·1	1·2
All Diseases of Genito-Urinary System	1·6	1·4	1·4	1·3	1·0	1·3
All Other Diseases	47·6	43·9	39·0	37·6	34·7	35·0
ALL DISEASES	89·3	84·8	82·2	79·3	71·7	76·6
ALL ACCIDENTS	6·7	6·2	7·0	6·4	6·4	6·6
ALL BATTLE CASUALTIES	4·1	9·0	10·8	14·3	21·9	16·8
ALL DISCHARGES	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 2

Crude Six-Monthly Rates per 100,000 Strength; Military Other Ranks; 1943-1945

(a) INDIVIDUAL DISEASES	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Psychiatric Disorders:						
Anxiety Neurosis	118·5	138·4	207·4	172·5	228·0	343·0
Hysteria	70·9	65·2	96·6	72·3	86·3	80·0
Psychopathic Personality	57·5	55·9	74·1	60·5	64·9	57·6
Mental Deficiency	21·7	23·8	32·5	21·3	24·3	24·1
Schizophrenia	19·9	22·8	29·4	24·1	20·3	26·8
Manic Depressive Psychosis	20·0	21·7	16·8	12·6	9·6	12·7
All Others	12·1	10·2	8·5	6·3	8·1	13·1
All Psychiatric Disorders	320·5	338·1	465·3	369·7	441·5	557·3
Peptic Ulcer	128·9	115·0	119·8	89·3	111·0	105·8
Bronchitis	42·2	48·9	58·9	45·8	69·8	62·8
T.B. Pulmonary	53·9	52·1	66·4	53·4	54·1	57·0
T.B. Other	9·4	11·5	10·4	7·3	7·5	9·0
Otitis Media	28·2	26·5	27·4	23·8	38·9	69·8
Rheumatic Conditions (excl. Rheumatic Fever):						
Articular	21·0	22·4	24·3	19·6	23·1	21·7
Non-Articular	5·8	6·8	6·4	5·9	12·6	12·9
Epilepsy	26·4	21·4	23·8	17·8	17·8	15·4
Deformities of Foot	13·5	11·9	11·3	9·1	22·8	30·4
Asthma	10·7	11·9	8·9	12·5	12·9	19·1
Synovitis and Arthritis	9·8	10·4	11·3	8·8	13·2	16·6
Sciatica	8·4	8·6	14·3	9·6	12·1	18·5
Neoplasm: Malignant	6·6	7·2	7·3	6·8	5·4	6·6
Benign and Unspecified	2·8	2·1	2·4	2·4	2·9	3·4
All Other Diseases	253·6	252·6	292·5	231·4	304·3	438·5
ALL DISEASES	941·7	947·4	1,150·7	913·2	1,149·9	1,444·8

(b) SPECIALIST GROUPS	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
All Psychiatric Disorders	320·5	338·1	465·3	369·7	441·5	557·3
All Diseases of E.N.T. (incl. *all* Deafness)	49·3	46·8	49·9	40·6	58·4	102·4
All Diseases of Skin	27·1	34·1	47·4	38·2	60·0	77·5
All Diseases of Eye	25·5	22·8	22·1	17·3	17·5	23·1
All Diseases of Genito-Urinary System	17·4	15·4	19·9	14·8	16·7	24·1
All Other Diseases	501·9	490·3	546·3	432·5	555·8	660·4
ALL DISEASES	941·7	947·4	1,150·7	913·2	1,149·9	1,444·8
ALL ACCIDENTS	70·3	69·7	98·6	73·6	102·0	125·4
ALL BATTLE CASUALTIES	42·9	100·5	150·5	164·7	352·0	316·3
ALL DISCHARGES	1,054·9	1,117·6	1,399·8	1,151·5	1,603·9	1,886·5

TABLE 3

Crude Relative Discharge Rates ; A.T.S. Other Ranks ; 1943-1945

(a) INDIVIDUAL DISEASES (expressed as R.S.D.Rs.)	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Psychiatric Disorders :						
Anxiety Neurosis	12·3	19·3	18·7	20·6	23·1	22·0
Hysteria	10·5	11·1	14·0	13·4	11·8	12·9
Psychopathic Personality	11·9	10·2	10·6	8·8	6·8	5·6
Mental Deficiency	4·3	2·6	2·0	1·9	1·2	1·1
Schizophrenia	3·3	2·2	1·6	2·0	1·7	2·6
Manic Depressive Psychosis	4·0	5·2	4·1	3·9	2·2	2·9
All Others	0·9	0·5	0·5	0·3	0·5	0·3
All Psychiatric Disorders	47·2	51·1	51·4	50·9	47·4	47·5
Peptic Ulcer	1·8	1·4	2·3	1·3	2·3	1·7
Bronchitis	2·2	2·0	1·8	1·5	2·6	1·6
T.B. Pulmonary	8·2	9·3	7·9	8·5	6·8	7·8
T.B. Other	2·2	2·2	2·1	2·1	1·5	1·8
Otitis Media	1·1	0·5	1·1	0·6	1·0	1·7
Rheumatic Conditions (excl. Rheumatic Fever) :						
Articular	1·6	1·4	1·3	1·3	1·8	1·4
Non-Articular	1·1	0·8	0·8	1·6	1·6	1·9
Epilepsy	4·5	2·5	2·3	3·5	2·1	2·5
Deformities of Foot	0·5	0·8	1·0	0·6	1·3	1·8
Asthma	1·6	2·2	2·0	4·0	2·5	3·4
Synovitis and Arthritis	0·9	0·7	0·5	1·1	0·5	1·3
Sciatica	0·2	0·5	0·7	0·5	0·5	0·8
Neoplasm : Malignant	0·6	0·3	0·5	0·5	0·4	0·5
Benign and Unspecified	0·7	0·6	0·4	0·5	0·7	0·4
All Other Diseases	25·6	23·6	23·9	21·5	26·8	24·0
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0

(b) SPECIALIST GROUPS (expressed as R.O.D.Rs.)	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
All Psychiatric Disorders	46·4	50·1	50·6	49·9	46·3	46·2
All Diseases of E.N.T. (incl. *all* Deafness)	2·2	1·8	2·2	1·8	2·4	2·7
All Diseases of Skin	2·2	2·1	2·2	2·0	2·4	2·6
All Diseases of Eye	1·7	1·1	1·0	0·8	0·7	0·7
All Diseases of Genito-Urinary System	5·7	5·3	4·7	4·8	5·2	3·9
All Other Diseases	40·3	37·6	37·6	38·9	40·6	41·3
ALL DISEASES	98·5	98·1	98·5	98·1	97·6	97·4
ALL ACCIDENTS	1·4	1·9	1·4	1·7	2·1	2·6
ALL BATTLE CASUALTIES	0·1	—	0·1	0·2	0·3	0·1
ALL DISCHARGES	100·0	100·0	100·0	100·0	100·0	100·0

§1 (*contd.*) DISCHARGES FROM THE ARMY ON MEDICAL GROUNDS

TABLE 4

Crude Six-Monthly Rates per 100,000 Strength; A.T.S. Other Ranks; 1943-1945

(a) INDIVIDUAL DISEASES	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
Psychiatric Disorders:						
Anxiety Neurosis	121·1	204·2	202·3	197·0	237·7	280·7
Hysteria	103·2	116·8	151·8	128·6	121·1	164·0
Psychopathic Personality	116·6	107·5	114·8	84·2	70·3	71·7
Mental Deficiency	41·9	27·4	21·6	18·4	12·6	13·7
Schizophrenia	32·4	23·3	17·0	19·3	17·1	32·8
Manic Depressive Psychosis	39·1	54·8	44·3	37·3	23·1	37·4
All Others	8·9	5·7	5·1	2·6	5·5	3·8
All Psychiatric Disorders	463·2	539·6	556·9	487·5	487·4	604·2
Peptic Ulcer	17·9	14·5	24·7	12·7	24·1	22·1
Bronchitis	21·8	21·2	19·6	14·5	27·1	19·8
T.B. Pulmonary	80·9	98·7	86·0	81·2	70·3	99·9
T.B. Other	21·8	23·3	23·2	19·7	15·6	22·9
Otitis Media	11·2	5·7	12·4	6·1	10·0	21·4
Rheumatic Conditions (excl. Rheumatic Fever):						
Articular	16·2	14·5	13·9	12·7	18·6	17·5
Non-Articular	11·2	8·8	8·7	15·4	16·6	23·6
Epilepsy	44·6	27·9	25·2	33·3	21·6	32·0
Deformities of Foot	5·0	8·8	11·3	6·1	13·6	22·9
Asthma	16·2	22·7	22·1	38·2	26·1	42·7
Synovitis and Arthritis	8·4	7·8	5·1	10·5	5·0	16·8
Sciatica	2·2	5·7	7·2	4·8	5·0	9·9
Neoplasm: Malignant	6·1	3·6	5·1	5·3	4·5	6·9
Benign and Unspecified	6·7	6·2	4·6	4·8	7·0	4·6
All Other Diseases	248·7	248·0	256·9	205·5	275·3	305·9
ALL DISEASES	982·1	1,057·0	1,082·9	958·3	1,028·0	1,273·3

(b) SPECIALIST GROUPS	1943		1944		1945	
	1st Half	2nd Half	1st Half	2nd Half	1st Half	2nd Half
All Psychiatric Disorders	463·2	539·6	556·9	487·5	487·4	604·2
All Diseases of E.N.T. (incl. *all* Deafness)	21·8	19·6	24·7	17·1	25·6	35·1
All Diseases of Skin	21·8	22·7	24·7	19·3	25·6	34·3
All Diseases of Eye	16·7	11·9	10·8	7·9	7·0	9·2
All Diseases of Genito-Urinary System	56·4	57·4	52·0	46·5	54·3	50·4
All Other Diseases	402·3	405·7	413·8	380·0	428·1	540·1
ALL DISEASES	982·1	1,057·0	1,082·9	958·3	1,028·0	1,273·3
ALL ACCIDENTS	14·0	20·7	15·4	16·7	21·6	33·6
ALL BATTLE CASUALTIES	1·1	—	1·5	1·8	3·5	0·8
ALL DISCHARGES	997·2	1,077·6	1,099·9	976·7	1,053·1	1,307·6

TABLE 5

Crude Relative Discharge Rates in Category C and Category E; Military Other Ranks; January—March 1945

(*a*) INDIVIDUAL DISEASES (expressed as R.S.D.Rs.)	Category C	Category E
Psychiatric Disorders:		
Anxiety Neurosis	15·7	20·5
Hysteria	7·3	7·9
Psychopathic Personality	1·4	6·1
Mental Deficiency	1·1	2·1
Schizophrenia	—	2·2
Manic Depressive Psychosis	—	1·0
All Others	0·1	0·7
All Psychiatric Disorders	25·7	40·7
Peptic Ulcer	0·2	11·4
Bronchitis	16·5	4·5
T.B. Pulmonary	0·2	5·9
T.B. Other	0·2	0·8
Otitis Media	9·5	2·3
Rheumatic Conditions : Articular	2·3	1·9
(excluding Rheumatic Fever): Non-Articular	4·1	0·6
Epilepsy	—	2·0
Deformities of Foot	8·2	0·7
Asthma	0·3	1·4
Synovitis and Arthritis	2·5	0·9
Sciatica	1·2	0·9
Neoplasm: Malignant	—	0·6
Benign and Unspecified	0·1	0·3
All Other Diseases	29·0	25·1
ALL DISEASES	100·0	100·0

(*b*) SPECIALIST GROUPS (expressed as R.O.D.Rs.)	Category C	Category E
All Psychiatric Disorders	22·4	28·6
All Diseases of E.N.T. (including *all* Deafness)	9·4	2·9
All Diseases of Skin	4·2	3·2
All Diseases of Eye	1·8	1·1
All Diseases of Genito-Urinary System	1·0	0·9
All Other Diseases	48·3	33·6
ALL DISEASES	87·1	70·4
ALL ACCIDENTS	6·7	6·0
ALL BATTLE CASUALTIES	6·1	23·6
ALL DISCHARGES	100·0	100·0

TABLE 6

Crude Relative Discharge Rates ; Q.A.I.M.N.S. and V.A.Ds. ; 1944

(*a*) DISEASES (expressed as R.S.D.Rs.)	Q.A.I.M.N.S.	V.A.Ds.
Psychiatric Disorders (excl. Mental Deficiency)	28·2	23·5
Peptic Ulcer	—	2·0
T.B. Pulmonary	16·4	7·8
T.B. Other	—	2·0
Bronchitis	0·9	3·9
Mental Deficiency	—	—
Otitis Media	0·9	—
Rheumatic Conditions : Articular	4·5	7·8
(excluding Rheumatic Fever) : Non-articular	1·8	2·0
Epilepsy	—	—
Dermatitis	—	2·0
Sciatica	0·9	2·0
Valvular Disease of the Heart	1·8	2·0
Synovitis and Arthritis	0·9	3·9
Deformities of Foot	—	2·0
Asthma	1·8	3·9
Dyspepsia and Gastritis	—	—
Nephritis	0·9	—
Neoplasm : Malignant	1·8	—
Benign and Unspecified	0·9	—
Diabetes Mellitus	0·9	—
All other Diseases	37·3	35·3
ALL DISEASES	100·0	100·0

(*b*) MAIN GROUPS (expressed as R.O.D.Rs.)	Q.A.I.M.N.S.	V.A.Ds.
All Nervous and Mental Diseases	31·6	31·4
All Diseases of Digestive System	—	3·9
All Diseases due to Infection	20·2	9·8
All Diseases of Respiratory System	6·1	7·8
All Diseases of Musculo-Skeletal System	7·9	17·6
All Diseases of Cardiovascular and Blood Systems	14·0	5·9
All Diseases of the Skin	1·8	5·9
All Diseases of E.N.T., Mouth, Teeth and Gums	2·6	3·9
All Diseases of the Eye	0·9	5·9
All Diseases of Genito-Urinary System	6·1	5·9
All Diseases of Nutrition and Metabolism and of Endocrine System	3·5	2·0
All Other Diseases	1·8	—
ALL DISEASES	96·5	100·0
ALL ACCIDENTS	2·6	—
ALL BATTLE CASUALTIES	0·9	—
ALL DISCHARGES	100·0	100·0

TABLE 7

Crude Annual Rates per 1,000 Strength; Q.A.I.M.N.S. and V.A.Ds.; 1944

(a) DISEASES	Q.A.I.M.N.S.	V.A.Ds.
Psychiatric Disorders (excl. Mental Deficiency)	3·3	3·1
Peptic Ulcer	—	0·3
T.B. Pulmonary	1·9	1·0
T.B. Other	—	0·3
Bronchitis	0·1	0·5
Mental Deficiency	—	—
Otitis Media	0·1	—
Rheumatic Conditions : Articular	0·5	1·0
(excluding Rheumatic Fever): Non-articular	0·2	0·3
Epilepsy	—	—
Dermatitis	—	0·3
Sciatica	0·1	0·3
Valvular Disease of the Heart	0·2	0·3
Synovitis and Arthritis	0·1	0·5
Deformities of Foot	—	0·3
Asthma	0·2	0·5
Dyspepsia and Gastritis	—	—
Nephritis	0·1	—
Neoplasm: Malignant	0·2	—
Benign and Unspecified	0·1	—
Diabetes Mellitus	0·1	—
All other Diseases	4·4	4·6
ALL DISEASES	11·8	13·1

(b) MAIN GROUPS	Q.A.I.M.N.S.	V.A.Ds.
All Nervous and Mental Diseases	3·9	4·1
All Diseases of Digestive System	—	0·5
All Diseases due to Infection	2·5	1·3
All Diseases of Respiratory System	0·7	1·0
All Diseases of Musculo-Skeletal System	1·0	2·3
All Diseases of Cardiovascular and Blood Systems	1·7	0·8
All Diseases of the Skin	0·2	0·8
All Diseases of E.N.T., Mouth, Teeth and Gums	0·3	0·5
All Diseases of the Eye	0·1	0·8
All Diseases of Genito-Urinary System	0·7	0·8
All Diseases of Nutrition and Metabolism and of Endocrine System	0·4	0·3
All Other Diseases	0·2	—
ALL DISEASES	11·8	13·1
ALL ACCIDENTS	0·3	—
ALL BATTLE CASUALTIES	0·1	—
ALL DISCHARGES	12·2	13·1

TABLE 8

Age-Standardized Discharge Rates per 100,000 Strength and Sex-Differentials; Military Other Ranks and A.T.S. Other Ranks; 1943 and 1944

DISEASE	1943				1944			
	(i) MILITARY OTHER RANKS	(ii) A.T.S. OTHER RANKS	(iii) SEX-DIFFERENTIAL (Female : Male)		(i) MILITARY OTHER RANKS	(ii) A.T.S. OTHER RANKS	(iii)) SEX-DIFFERENTIAL (Female : Male)	
			Based on Standardized Rates (ii÷i)	Based on Crude Rates			Based on Standardized Rates (ii÷i)	Based on Crude Rates
Anxiety Neurosis	227·4	545·5	2·40	1·27	318·7	644·9	2·02	1·05
Hysteria	136·4	257·2	1·89	1·62	164·8	333·7	2·02	1·66
Psychopathic Personality	121·9	257·7	2·11	1·98	144·6	235·0	1·63	1·48
Mental Deficiency	52·2	74·0	1·42	1·52	61·7	44·8	0·73	0·74
Schizophrenia	48·9	65·5	1·34	1·30	62·8	42·8	0·68	0·68
Manic Depressive Psychosis	36·2	123·5	3·41	2·25	24·2	105·8	4·37	2·78
Peptic Ulcer	197·8	46·7	0·24	0·13	159·5	53·7	0·34	0·18
Bronchitis	109·2	86·8	0·79	0·47	112·1	67·2	0·60	0·33
T.B. Pulmonary	116·5	161·5	1·39	1·69	131·9	153·0	1·16	1·40
Other Sites	23·4	41·7	1·78	2·16	20·1	40·7	2·02	2·42
All	139·8	203·4	1·45	1·77	152·1	193·7	1·27	1·53
Epilepsy	56·5	60·4	1·07	1·52	50·3	51·5	1·02	1·41

§2 MEDICAL DISCHARGE OF EX-PRISONERS OF WAR

DATA in this Section (Tables 9-10) include all cases recommended for discharge up to the end of July 1946, *i.e.* almost a full year since VJ Day. So the number of " pending " discharges is small and is unlikely to affect materially the rates cited. No doubt some bias still persists, insofar as the contribution of long term cases such as Tuberculosis, Psychiatric disorders and serious injuries may be slightly lower than the true figure, particularly w.r.t. soldiers repatriated from the Far East, many of whom reached this country considerably later than those from Europe. For comparative purposes a control group in Table 9 includes all *non*-prisoner discharges in Category " E " during 1943 to mid-1946. Routine medical discharge figures include Category E and Category C cases; but what follows *excludes* " C " cases, which make up a less clear-cut class of discharge affected both by changing army man-power requirements and by the discretionary powers of the authorities. Category " E " cases alone, *i.e.* cases notified on A.F. B.3978 as permanently unfit for further service, provide more suitable basic data for a comparison *either* between ex-Ps.W. who have spent their captivity in different theatres *or* between such ex-prisoners and soldiers who have not been prisoners at all.

A difficulty arises in connection with cases which record two or more diagnoses. With respect to *overall* discharge figures, this is a minor problem, because only a relatively small proportion of all cases show more than one diagnosis. Even when two do appear, the first is defined as the *Invaliding disability*, and the second, as the *Secondary disability*. In so far as this distinction is valid, we are entitled to concentrate on the first disability; but the frequency of secondary disabilities among prisoners from the Far East is a suspicious circumstance. A high proportion of documents (over a half) show a second diagnosis and an appreciable number show more than two. Since it is possible to code only two disabilities on A.F. B.3978, the second disease recorded for such cases involves an act of judgment. Which of the two diseases cited is in fact the invaliding disability may well be a matter of opinion, as when we encounter two casualties respectively specified as (1) Beri-beri, (2) Malaria, and (1) Malaria, (2) Beri-beri. In these circumstances we should scarcely be justified in ignoring the second diagnosis. Although rates in the attached tables refer only to the *primary* disability cited, additional comments w.r.t. the secondary diagnosis therefore appear in the text where appropriate.

Ex-prisoners fall mostly into two classes: (i) those captured in Europe; (ii) those captured in the Far East. No more refined geographical separation is justified, because there was considerable mobility of prisoners within each of these main areas; but it is important to draw a distinction between Ps.W.: (*a*) *repatriated* to this country from Europe under the special provisions of the Geneva convention, (*b*) *liberated* in the course of occupation of enemy territory in Europe. On the basis of codes then in use, it is not possible to differentiate with certainty between repatriated and liberated cases; but it is possible to separate the two groups without serious error by recourse to the date of discharge. Clearly, a preponderance of ex-prisoners discharged before D Day must have been repatriated. Indeed, there could have been very few discharges of liberated prisoners before the beginning of 1945. In the ensuing tables this date has been selected as the boundary date involving least error. Repatriated and liberated prisoners from Europe separated in this manner appear in Tables 9 and 10. The separate diagnostic distributions of the two classes sufficiently underline the importance of this separation. The item designated *Other Deficiency Diseases* includes *inter alia* a small number of Pellagra cases and others shown as Malnutrition without further qualification. *Optic Neuritis* includes retro-bulbar neuritis and optic atrophy. *Dysentery Others and Unspec.* includes all Dysentery cases not specified as amoebic.

Prisoners from Europe

Table 10 shows that more than two-fifths of all discharges among prisoners *repatriated* from Europe were attributable to Battle Casualties; this is a much higher proportion than in any of the other groups. Of discharges w.r.t. *disease* alone a quarter were due to *Tuberculosis*, more than a fifth to *Psychiatric Disorders* and more than a tenth to *Peptic Ulcer*. These are familiar causes of discharge; but Table 9 reveals how widely their relative contributions differ from corresponding figures w.r.t. *non*-prisoners. It may well be that the Germans applied very exacting criteria for repatriation of psychiatric cases. In part at least this may explain the comparatively low rate for these disorders. On the other hand, cases of *Tuberculosis* with a conspicuously high rate can be diagnosed with greater confidence and cannot be of further use to the Army. Except w.r.t. *Tuberculosis*, for which the relative rate is twice as high, the distribution of discharges attributable to disease among prisoners *liberated* from Europe in contradistinction to that of repatriated soldiers, does not differ very substantially from that of the residual army population. The relative rate for Tuberculosis is, however, still less than half the corresponding rate among repatriated soldiers.

Prisoners from Far East

As we should expect, prisoners from the Far East present an entirely different picture. *Malaria* alone accounts for a third of all discharges w.r.t. disease. *Beri-beri* accounts for 9%, and other, mostly unspecified, deficiency diseases for 4%. *Optic Neuritis* (here including retro-bulbar neuritis and optic atrophy) makes up 5½% and *Defects of the Field of Vision* a further 2%. *Amoebic Dysentery*, other types of *Dysentery*, and *Oriental Sore* each contribute 2½%. Even such high figures do not give full weight to the importance of these diseases as causes of discharge, since they are based on the *first recorded* diagnosis alone. If we take into account the large number of cases in which they appear as a second diagnosis, we find that no less than 41% of all ex-Far Eastern prisoners discharged, had malaria cited either as a first or as a second diagnosis: 32½% as primary grounds for discharge, and 8½% as a secondary disability. Beri-beri was recorded of 18% of men discharged; and of these half the number had it seriously enough to appear as the primary diagnosis. A further 8% had other deficiency diseases either as a first or a second diagnosis. Thus *more than* 25% of these men are known to have suffered from some form of *nutritional deficiency*. Optic Neuritis or Defects of the Field of Vision appeared in 11% of the discharges; Dysentery unspecified in 8%; Amoebic Dysentery in 3½%, and Oriental Sore in 4%. If it had been possible to record third and fourth diagnoses as well, it is almost certain that such *composite* estimates would be higher still. Familiar major items, *viz.* Psychiatric Disorders, Peptic Ulcer and Tuberculosis together account for little more than a tenth of the total, and the inclusion of discharges still to come (*see* above) is not likely to increase their contribution substantially. Indeed even relative rates w.r.t. Psychiatric Disorders and Peptic Ulcer computed after *exclusion* from the total of items which rarely occur among other discharges (*i.e.* Malaria, Deficiency Diseases, Oriental Sore, Optic Neuritis and Dysentery), still remain much lower than corresponding figures for the residual relevant army population.

Comparative Rates

Table 10 brings out the important causes of discharge in each ex-prisoner category *separately*. Table 9 compares

for diseases only the several ex-prisoner rates with corresponding figures for *non*-prisoners, and also shows a consolidated figure for *all* prisoners from Europe whether repatriated or liberated. When comparing these relative rates it is important to give due consideration to the personnel involved in the comparison. All Ps.W. must have been initially of sufficiently high medical category for overseas service, being in fact survivors of a weeding out process; but the residual group of *non*-prisoners includes also low category men deemed fit for service in U.K. only. The most striking differences between the several classes have already been the subject of comment above; the only important disease which makes a similar contribution to all groups is *Bronchitis* (4%-5%). Both in Table 9 and Table 10 psychiatric disorders appear collectively. A breakdown of the total, as shown below, brings out an interesting difference:

	Non-Prisoners	*Ps.W. Ex-Europe*	*Ps.W. Ex-Far East*
Manic Depressive Psychosis	3·9	1·7	3·1
Schizophrenia	6·3	5·6	6·3
Anxiety Neurosis	45·5	76·2	62·8
Hysteria	19·3	10·2	6·8
Psychopathic Personality	16·3	2·8	1·0
Mental Deficiency	6·5	0·5	0·5
Other Psychiatric Disorders	2·2	3·0	19·4
All Psychiatric Disorders	100·0	100·0	100·0

The contribution of psychoses in the three classes does not differ greatly. Nor is it surprising that "Psychopathic Personalities" and "Mental Defectives" are almost entirely absent from the ex-prisoner groups since such cases would generally be weeded out in the early stages, and would not be sent overseas. The salient point that does emerge from this breakdown, however, is the ratio of Anxiety Neurosis to Hysteria. Whereas this ratio is little more than 2 : 1 among *non*-prisoners, it is more than 7 : 1 among prisoners from Europe and more than 9 : 1 among Far Eastern prisoners. To what extent this is due to different age distributions of the three groups, it is impossible to say without recourse to further data not readily available.

Absolute Discharge Rates

All figures in Tables 9 and 10 refer to *relative* as opposed to *absolute* discharge rates. To complete the picture it would be instructive to examine the absolute figures as well *i.e.* to assess the *actual rates of discharge per* 1,000 *ex-prisoners* returned to the U.K. A comprehensive survey of absolute rates should include other relevant information, such as death rates while still in enemy hands and length of captivity. In fact, we have no precise information of this sort. Even the number of medical discharges reported to us as ex-P.W. cases is somewhat deficient, particularly w.r.t. early repatriated cases from Europe. It is, however, worth recording what information we do have if only to give some idea of the order of magnitude of the figures involved. We find that rates for Tuberculosis, Peptic Ulcer and Psychiatric Disorders among prisoners from the Far East, as compared with those from Europe, do not represent, as one might have suspected from relative rates alone, simply *lower proportions of a much higher total*, but are, in fact, substantially lower *absolutely*. Of all prisoners from the Far East approximately 2½ per 1,000 were discharged for Tuberculosis, as compared with 9 per 1,000 from Europe. Absolute rates for Psychiatric Disorders are 6½ per 1,000 and 23 per 1,000 respectively for Far East and Europe; and for Peptic Ulcer they are 2½ and 6 per 1,000. Inclusion of Category C discharges would increase these rates only slightly. On the other hand, absolute discharge rates in category "E" w.r.t. Bronchitis, Otitis Media and Asthma do not differ greatly in the two groups. The overall discharge rate w.r.t. *all diseases* is not much higher than 10% among prisoners ex-Far East, and is less than 10% among prisoners from Europe. If we did not know that all ex-prisoners must have been initially selected as fit for overseas service, we might be tempted to argue from this that discharges attributable to disease among ex-prisoners do not greatly exceed those among other soldiers, since the rate for the Army as a whole is of the order of 2% a year, which would amount to 6-8% in a period of 3 or 4 years, the approximate mean duration of captivity. But the appropriate population to use as a control group for ex-prisoners discharges is not the whole of the residual army but only those soldiers with overseas service at no time in captivity. Unfortunately, separate figures for this class are not available, but it is certain that discharge rates among such soldiers must be very much lower than among the total army population, excluding prisoners. In view of these considerations, it is permissible to repeat that figures cited above do not tell the whole story. They serve a purpose if they provide a background against which to adjust our perspective of the *relative* rates.

Association of Diseases

Although we have not neglected the contribution of the second diagnosis, we have not as yet shown which secondary disabilities are associated with which primary ones. For nearly half the Far East prisoners whose primary disability belongs to one of the major diagnostic categories, the records supply no secondary condition. When there is a second diagnosis, it too is usually one of the major items. Thus, 16% of Malaria cases cite Beri-beri as a second diagnosis and 15% have Dysentery. On the other hand, 14% of cases with Beri-beri as the *primary* diagnosis show Malaria as a secondary disability. Of cases with a primary diagnosis of Amoebic Dysentery, 22% record Malaria as well, and 9% show Beri-beri. Records of discharges w.r.t. deficiency diseases frequently cite an eye condition as a secondary diagnosis and *vice versa*. A less obvious association occurs among cases shown primarily as Beri-beri. One in twenty of these record hypertension as a secondary disability. These figures confirm our initial impression that there is little uniformity about which disease of this Eastern group takes precedence as the invaliding disability, and emphasize what distortion would arise if due attention were not paid to the secondary disability.

The situation with regard to ex-prisoners from Europe is not the same. A much lower proportion (26%) record a secondary disability, and even where secondary disabilities are on record they are generally widely distributed. Nor is there the same degree of association between pairs of diseases as there is among Far Eastern prisoners. In general, therefore, discharges among prisoners from Europe, as among non-prisoners, are usually attributable to a single fairly clear-cut condition such as Tuberculosis or Peptic Ulcer, or to a Psychiatric Disorder. A high proportion of Far East prisoners on the other hand suffer from a combination of disabilities, individually, it may be, insufficient to merit discharge though collectively of sufficient gravity to render them unfit for further service.

Summary

The main conclusions which this section exposes are:

(*a*) The major causes of discharge w.r.t. disease among British Army ex-prisoners from Europe are similar to those among *non*-prisoners. The outstanding difference concerns Tuberculosis which contributes over 14% to ex-P.W. discharges, as compared with 6% among non-prisoners.

(*b*) Cases *repatriated* as opposed to liberated from Europe include a much higher proportion (25%) of Tuberculosis cases and a comparatively low proportion (21%) of Psychiatric cases.

(*c*) Among ex-prisoners from the Far East the main causes of discharge are : Malaria, Beri-beri and other deficiency diseases, Psychiatric disorders and Optic Neuritis and other eye conditions. A high proportion of discharge is attributable coincidently to two or more of these conditions.

TABLE 9

Relative Discharge Rates ; Non-Prisoners compared with Ex-Prisoners of War

	Non-Prisoners	Ps.W. Ex-Europe	Ps.W. Ex-Far East	Ps.W. Ex-Europe*	
				Repatriated	Liberated
All Psychiatric Disorders	39·3	36·3	6·0	21·5	40·1
Peptic Ulcer	11·0	9·6	2·4	11·7	9·0
T.B. Pulmonary	5·2	13·5	2·2	23·3	11·0
T.B. Other Types	0·9	0·9	0·3	2·0	0·6
Bronchitis	4·2	4·8	3·9	5·8	4·5
Rheumatic Conditions	2·7	1·3	0·7	1·3	1·3
Otitis Media	2·5	2·9	2·2	1·3	3·3
Epilepsy	2·1	0·6	0·2	1·1	0·5
Asthma	1·2	1·3	0·7	2·7	1·0
Sciatica	1·2	0·4	0·4	0·5	0·4
V.D.H.	1·2	1·5	0·5	2·3	1·3
Deformities of Foot	1·1	1·1	0·9	0·1	1·3
Synovitis and Arthritis	1·0	0·8	0·5	0·8	0·8
Dyspepsia and Gastritis	0·7	1·2	0·9	1·2	1·1
Nephritis	0·7	1·7	0·7	3·5	1·3
Diabetes Mellitus	0·6	0·5	0·1	1·1	0·4
Dysentery Amoebic	0·4	0·3	2·5	0·1	0·3
Dysentery Others and Unspecified....	0·0	0·3	2·6	—	0·4
Defects of Field of Vision	0·3	0·2	2·0	0·2	0·2
Optic Neuritis	0·1	0·1	5·6	0·1	0·1
Malaria	0·1	1·4	32·5	0·2	1·7
Beri-beri	0·0	0·1	8·7	0·1	0·2
Other Deficiency Diseases	—	0·3	4·2	—	0·4
Oriental Sore....	0·0	0·1	2·4	—	0·1

* Breakdown of second column.

TABLE 10

Relative Discharge Rates; Ex-Prisoners of War

(a) Ps.W. ex-Europe (Repatriated)

Disease	Relative Rate
T.B. Pulmonary	23·3
T.B. Other Types	2·0
All Psychiatric Disorders	21·5
Peptic Ulcer	11·7
Bronchitis	5·8
Nephritis	3·5
Asthma	2·7
V.D.H.	2·3
Otitis Media	1·3
Dyspepsia and Gastritis	1·2
Epilepsy	1·1
Diabetes Mellitus	1·1
Other Diseases	22·5
All Diseases	100·0
ALL DISEASES	55·4
ALL ACCIDENTS	2·8
ALL BATTLE CASUALTIES	41·9
ALL DISCHARGES	100·0

(b) Ps.W. ex-Europe (Liberated)

Disease	Relative Rate
All Psychiatric Disorders	40·1
T.B. Pulmonary	11·0
T.B. Other Types	0·6
Peptic Ulcer	9·0
Bronchitis	4·5
Otitis Media	3·3
Malaria	1·7
Deformities of Foot	1·3
V.D.H.	1·3
Nephritis	1·3
Dyspepsia and Gastritis	1·1
Asthma	1·0
Other Diseases	23·8
All Diseases	100·0
ALL DISEASES	80·9
ALL ACCIDENTS	3·4
ALL BATTLE CASUALTIES	15·7
ALL DISCHARGES	100·0

(c) Ps.W. ex-Far East

Disease	Relative Rate
Malaria	32·5
Beri-beri	8·7
Other Deficiency Diseases	4·2
All Psychiatric Disorders	6·0
Optic Neuritis	5·6
Defects of Field of Vision	2·0
Amblyopia and Amaurosis	0·5
Bronchitis	3·9
Dysentery Amoebic	2·5
Dysentery Others and Unspec.	2·6
Peptic Ulcer	2·4
Oriental Sore	2·4
T.B. Pulmonary	2·2
T.B. Other Types	0·3
Otitis Media	2·2
Other Diseases	22·0
All Diseases	100·0
ALL DISEASES	90·3
ALL ACCIDENTS	2·9
ALL BATTLE CASUALTIES	6·8
ALL DISCHARGES	100·0

§3 DISCHARGES OF A.T.S. UNDER PARA. 11 (PREGNANCY CERTIFICATION)

AS a source of wastage in the Army, it is important to assess the absolute discharge rate with respect to pregnancy in the A.T.S. In 1944 indeed, discharges from the A.T.S. on family grounds accounted for about 80% of all discharges resulting from a medical examination. From the standpoint of man-power planning, it is therefore instructive to exhibit side by side as in Table 11:

(*a*) the crude mean monthly rate with respect to pregnancy certification;

(*b*) the crude mean monthly rate with respect to discharges on account of sickness or injury;

(*c*) the crude mean monthly rate with respect to discharges for pregnancy, sickness and injuries taken together;

(*d*) the proportionate contribution of pregnancy certification to the total shown in column (*c*).

In terms of man-power planning, the salient features of Tables 11 and 12 are these:

(*a*) Pregnancy accounts for about FOUR-FIFTHS of ALL discharges of A.T.S. (O.R.s) on the basis of medical certification of one sort or another;

(*b*) To *maintain* the number of auxiliaries it is necessary to replace married A.T.S. discharged on family grounds IN THE COURSE OF A SINGLE YEAR by a compensatory recruitment equivalent to NEARLY HALF THE TOTAL of married auxiliaries;

(*c*) Unless discharge rates with respect to sickness and injuries among married and single A.T.S. differ more grossly than is at all likely, pregnancy accounts for about NINETY-FIVE PER CENT of all discharges of married auxiliaries on medical grounds.

While giving a true estimate of actual wastage from this source, the Crude Mean Monthly Rate* (C.M.M.R.) for pregnancy certification may give rise to an erroneous impression, if the problem which exercises administration is the extent to which circumstances attendant on army life or public policy are more or less propitious to fertility within the army population. In this context fertility is used in its demographic, as opposed to its biological, connotation. That is to say, it denotes nothing more than reproductive frequency without regard to circumstances, social or physiological, contributory thereto. Different levels of fertility in this sense may reflect greater or less reproductive frequency in *comparable* populations, or differences with respect to population structure. The two chief attributes of population structure which may give rise to different crude fertility rates, such as the crude mean monthly pregnancy rate of Table 11, are:

(i) differences of age composition;

(ii) differences with respect to the proportion of married women.

The number of children per woman falls off steeply during the course of the reproductive period. *Ceteris paribus*, an older A.T.S. population will, therefore, have a lower crude fertility rate; and a rise of the crude pregnancy rate may signify nothing more than increased recruitment of younger age groups. Likewise reproductive frequency is much higher among married women than among single ones. Hence an increase of the *nuptiality ratio* (here defined as the proportion of married A.T.S.) either because of recruiting relatively more married women or because of increased nuptiality under service conditions, will of itself increase the crude mean monthly pregnancy rate, if all other circumstances remain the same. If, therefore, we are concerned to probe the reasons for a rise or fall of the crude discharge rate on family grounds, it is necessary to employ indices which eliminate variations solely attributable to age or to nuptiality. During the period under review, more especially 1944, the possible effect of changes w.r.t. age-composition of the A.T.S. was comparatively small; but there was an appreciable shift of the marriage rate.

A change arising from this source alone can be brought into clearer perspective by the *Nuptial Standardized Pregnancy Rate* (N.S.P.R.). This is what the C.M.M.R. would be if the nuptiality ratio remained at a fixed level, here taken to be one seventh, its approximate current value at the end of the first quarter of 1944. For the calculation of the N.S.P.R. we thus adopt a standard population of which six-sevenths are single and one-seventh married. To obtain its value we merely apply the weights 1/7 and 6/7 to the C.M.M.Rs. for married and single auxiliaries respectively, adding the products together. A rise or fall of the crude pregnancy rate arising solely from nuptiality will show if the C.M.M.R. rises or falls while the N.S.P.R. remains steady. In the first quarter of 1944 (Table 12), the N.S.P.R. was greater than the C.M.M.R. Thereafter the reverse was true. Thus, the C.M.M.R. at the end of the year was greater than it would have been if the nuptiality ratio had remained the same as at the end of the first quarter. In other words, the proportion of married women increased and the divergence between the figures for January and December 1944 may be due in large part to this circumstance.

From mid-1942, discharges from the A.T.S. due to pregnancy rose gradually until in mid-1945 (Table 13) the rate had almost doubled itself. Unfortunately, figures for married and single auxiliaries were not specified separately until the end of 1943. Data for 1944 and the first half of 1945, however, suffice to indicate that the increase of pregnancy rates was due to a corresponding increase of the proportion of married auxiliaries. Discharges for pregnancy among married and single auxiliaries remained at the same level of approximately 450 per 1,000 and 25 per 1,000 respectively, and the nuptial standardized rates show that pregnancy rates with respect to all auxiliaries would also have been constant had the proportion of married women been the same (one in seven) throughout the period. We can fairly confidently assume that the increase of pregnancy during the first 18 months was similarly caused by a rise in the nuptiality ratio, in view of changing policy with respect to employment of married women, on the one hand, and of the increasing number of marriages among single servicewomen, on the other. Table 14 and Chart 4 show the rising contribution of pregnancy to all discharges on medical and family grounds, from under 70% to over 80% of the total wastage.

Summary

The main conclusions exhibited in Tables 11-14 and Chart 4 are as follows:—

(*a*) the crude pregnancy rate of A.T.S. auxiliaries increased steadily over the three-year period for which statistics are available;

(*b*) during the latter 18 months for which we have separate data for married and single auxiliaries, the crude rates for each category maintained a fairly constant level;

(*c*) in all probability, therefore, the increase in (*a*) above is almost entirely due to a progressive increase of the proportion of married personnel;

(*d*) presumably the same explanation applies to the increasing contribution of pregnancy to total wastage over the three years under review.

*A Mean Monthly Rate (M.M.R.) is a rate adjusted to correspond with that for a month of *fixed length* (30·5 days) almost exactly equal to one-twelfth of a calendar year. This renders possible *valid comparison between figures relating to different calendar months*. Annual totals can be obtained by the *summation of* 12 *mean monthly rates, i.e.* the M.M.R. is one-twelfth of the *Equivalent Annual Rate*. A *Crude* Mean Monthly Rate (C.M.M.R.) is a M.M.R. which has *not been age-standardized, i.e.* one in which no allowance has been made for differences with respect to age composition of populations at risk.

TABLE 11

Discharge Rates for Pregnancy, Sickness and Injury; A.T.S. Other Ranks; Crude M.M.Rs. per 100,000 Total Strength; 1944

	(*a*) Pregnancy	(*b*) Sickness and Injury	(*c*) Total (*a*) + (*b*)	(*d*) Pregnancy as % of Total
January	681·2	163·5	844·7	80·6
February	740·9	161·6	902·5	82·1
March	724·6	207·2	931·8	77·8
April	755·2	165·1	920·3	82·1
May	831·9	204·1	1036·0	80·3
June	866·8	181·9	1048·7	82·7
July	761·1	216·4	977·5	77·9
August	738·2	195·2	933·4	79·1
September	623·3	213·3	836·6	74·5
October	706·2	168·5	874·7	80·7
November	756·8	183·6	940·4	80·5
December	803·3	184·6	987·9	81·3

TABLE 12

Mean Monthly Pregnancy Rates (per 1,000) with reference to Married and Single A.T.S. Other Ranks; 1944

	Married	Single	All	
	C.M.M.R.	C.M.M.R.	C.M.M.R.	N.S.P.R.
January	34·3	2·4	6·8	7·0
February	39·0	2·5	7·4	7·7
March	39·2	2·0	7·2	7·3
April	39·3	2·3	7·6	7·6
May	42·7	2·4	8·3	8·2
June	41·6	2·7	8·7	8·3
July	36·0	2·4	7·6	7·2
August	35·2	2·3	7·4	7·0
September	29·2	2·0	6·2	5·9
October	35·6	1·8	7·1	6·6
November	34·5	2·7	7·6	7·2
December	37·5	2·4	8·0	7·4

TABLE 13

Equivalent Annual Pregnancy Rates per 1,000 Strength with respect to Married and Single A.T.S. Auxiliaries ; July 1942–June 1945

Period		E.A.R. per 1,000 Strength			Nuptial Standardized Pregnancy Rate
		Married	Single	Total	
1942	3rd Quarter	—	—	54·9	—
	4th Quarter	—	—	54·7	—
1943	1st Quarter	—	—	59·6	—
	2nd Quarter	—	—	64·8	—
	3rd Quarter	—	—	71·0	—
	4th Quarter	—	—	78·9	—
1944	1st Quarter	449·2	27·6	85·6	87·8
	2nd Quarter	494·4	29·6	98·4	96·0
	3rd Quarter	401·6	26·8	84·8	80·3
	4th Quarter	430·4	27·6	90·8	85·1
1945	1st Quarter	408·0	27·6	93·2	81·9
	2nd Quarter	457·2	25·6	101·6	87·3

TABLE 14

Discharges from the A.T.S. with respect to Pregnancy, Sickness and Injury : Equivalent Annual Rates per 1,000 Strength ; July 1942–June 1945

Period	Pregnancy	Sickness and Injury	Total	Pregnancy as % of Total
July-Dec. 1942	55·23	25·19	80·42	68·7
Jan.-Dec. 1943	68·89	20·66	89·55	76·9
Jan.-Dec. 1944	89·87	22·50	112·37	80·0
Jan.-June 1945	96·37	20·64	117·01	82·4

MEDICAL records w.r.t. deaths were defective during the greater part of the war on account of *direct* transmission from E.M.S. hospitals to the Ministry of Pensions. *Absolute* Mortality Rates (Table 16) were calculated by scaling up figures based on A.Fs. I 1220 received at the War Office in accordance with the deficiency inferred from data supplied by A.G.Stats.* The computation of Army Fatality Rates, which represent the number of deaths from a particular disease expressed as a proportion of the number of *hospital cases*, involves an additional correction. If the deficiency w.r.t. deaths were the same as the deficiency w.r.t. cases admitted, no adjustment would be necessary because the *ratio* of deaths to cases, as opposed to the actual numbers of either, would be approximately correct. This is not so. The routing of death and discharge notifications differs from that of other cases. In consequence, deficiencies w.r.t. deaths are much greater than deficiencies w.r.t. those who return to duty. In order to compute reliable Fatality Rates it is therefore necessary: (*a*) to adjust the number of deaths by reference to the known overall total; (*b*) to adjust the number of cases at risk in accordance with an estimate of the deficiency w.r.t. such cases. Fatality rates so assessed should be reliable within fairly narrow limits, insofar as they relate only to deaths of soldiers *still in the Army*. In certain cases, soldiers invalided from the Army may die later; but from an army point of view such cases would count as medical discharges, and would therefore be included in the analysis of discharges (§1). On this account, indices here cited are clearly *not* comparable with corresponding civilian rates. If the end in view is to assess death as a source of wastage to the Army, the Mortality Rate is the appropriate index. The Fatality Rate is a measure of the *expectation of death* w.r.t. a particular disease *during the period of service*.

It is important to bear in mind another consideration in connexion with the tables (15-17) accompanying this Section. Since the age composition of military officers, of other ranks and of A.T.S. is entirely different, no biological conclusions can be drawn with confidence from comparison of crude rates, as are those here cited. The numbers of deaths from individual diseases are too few to permit the calculation of age-standardized rates. What the tables do show is a picture of army deaths *as they were* in the U.K. during 1943. The data summarized in them are relevant to the administrative, rather than to the biological, problem of assessing the significance of death from disease or accidental injury as a source of wastage to the Army. Total numbers in the A.T.S. sample were small. So all A.T.S. rates must be treated with reserve. Chart 5 which refers to a longer period does not tally exactly with the contents of Tables 15-17.

Mortality Rates

The Relative Mortality Rates of Table 15 show that TUBERCULOSIS and MALIGNANT NEOPLASM were the main causes of death among military personnel in the U.K. during 1943. Each accounted for about one-seventh of all deaths due to disease. For officers alone, the contribution of Malignant Neoplasm was very much higher. Among A.T.S., T.B. by itself accounted for more than a quarter of all sick deaths, the rate for Neoplasms being substantially lower. ACCIDENTS made up one-third of all non-battle deaths among military, but only one in ten among A.T.S. With one conspicuous exception (*see below*), Absolute Mortality Rates, as shown in Table 16, disclose differences one might expect in view of the different age composition of the three types of personnel. It is not true that old soldiers never die. Old soldiers are, in fact, much more likely to die than young ones. Figures w.r.t. Malignant Neoplasm, essentially a disease of the older age groups, provide a striking example. Among military officers, who have a relatively large proportion of strength in the higher age groups, the absolute mortality rate w.r.t. Neoplasm was five times that of military other ranks. This in turn was five times that of the A.T.S., of whom only a very small proportion are over 30 years. Though the higher mean age of military officers and the lower mean age of A.T.S. as compared with that of military other ranks offers an explanation of some of the differences in Tables 15 and 16, the absolute mortality rates for appendicitis are anomalous, since the risk of onset is highest in the younger age groups. It would appear that there is a greater risk of fatal complications in the older age range which more than offsets a higher incidence among the younger groups. This hypothesis is supported by the *fatality* rate, which for military officers alone is 22·6 per 1,000 cases, while for other ranks it is 13·1 and for A.T.S., 2·8. However, the small number of deaths involved, particularly among military officers, does not permit us to regard these figures as conclusive.

In 1943 military officers in the U.K. lost 2·8 per 1,000 of total strength as a result of death from all disease, while other ranks lost 1·3 per 1,000 and A.T.S. 0·6 per 1,000. Inclusion of deaths attributable to accidental injuries brings the overall rate for military officers and other ranks taken together to 2 per 1,000 of total strength. This is about one-tenth of the corresponding figure for *invaliding*. The A.T.S. Mortality Rate w.r.t. disease and accidents was 0·7 per 1,000, only about one-thirtieth of their discharge rate in the same year.

Army Fatality Rates

Among military personnel, 10% of *Tuberculosis* cases died while still in the Service. Corresponding rates for *Nephritis* and *Meningococcal Infection* both exceeded this figure, but of the other diseases specified none had a fatality greater than 4%. It is unfortunately impossible to cite a rate for *Malignant Neoplasm*, since many cases do not appear as a primary diagnosis on hospital admission; but it is almost certain that fatality would have been much higher than any cited. Less than 0·7% of all military admissions to hospital w.r.t. disease died, and about 2% of accidental injuries proved fatal. Among A.T.S. only 0·3% of hospital admissions died.

* The War Office branch responsible for personnel statistics.

TABLE 15

Relative Mortality Rates; British Army in the U.K.; 1943

DISEASE	Military			A.T.S.
	Officers	Other Ranks	All	
Tuberculosis—all forms	9·3	14·9	14·3	27·0
Malignant Neoplasm	28·0	12·1	13·9	5·4
Pneumonia	2·7	6·2	5·8	10·8
Peptic Ulcer	1·3	5·2	4·8	—
Appendicitis	4·0	4·3	4·2	5·4
Nephritis	8·0	2·6	3·2	—
Meningococcal Infection	—	2·6	2·3	8·1
Hernia	—	1·8	1·6	—
Bronchitis	1·3	1·5	1·5	—
Diphtheria	—	1·5	1·3	8·1
Otitis Media	—	1·1	1·0	—
Tonsillitis	—	1·1	1·0	—
Toxic Jaundice	—	1·1	1·0	—
V.D.H.	1·3	0·7	0·7	—
Other Diseases	44·1	43·3	43·4	35·2
ALL DISEASES	100·0	100·0	100·0	100·0
ALL DISEASES	75·0	67·0	67·8	90·2
ALL ACCIDENTS	25·0	33·0	32·2	9·8
ALL DEATHS	100·0	100·0	100·0	100·0

TABLE 16

Absolute Mortality Rates per 1,000,000 Strength; British Army in the U.K.; 1943

DISEASE	Military			A.T.S.
	Officers	Other Ranks	All	
Tuberculosis—all forms	262	198	202	164
Malignant Neoplasm	790	161	196	33
Pneumonia	76	82	82	66
Peptic Ulcer	37	69	68	—
Appendicitis	113	57	59	33
Nephritis	226	35	45	—
Meningococcal Infection	—	35	32	49
Hernia	—	24	23	—
Bronchitis	37	20	21	—
Diphtheria	—	20	18	49
Otitis Media	—	15	14	—
Tonsillitis	—	15	14	—
Toxic Jaundice	—	15	14	—
V.D.H.	37	9	10	—
Other Diseases	1,245	572	614	214
ALL DISEASES	2,823	1,327	1,412	608
ALL DISEASES	2,823	1,327	1,412	608
ALL ACCIDENTS	941	654	670	66
ALL DEATHS	3,764	1,981	2,082	674

TABLE 17

Army Fatality Rates per 1,000 Cases ; British Army in the U.K.; 1943

DISEASE	Military	A.T.S.
Tuberculosis—all forms	97·6	87·0
Malignant Neoplasm	N.A.	N.A.
Pneumonia	20·4	28·4
Peptic Ulcer	23·2	—
Appendicitis	13·7	2·8
Nephritis	144·6	—
Meningococcal Infection	138·1	337·9
Hernia	2·5	—
Bronchitis	2·8	—
Diphtheria	28·6	40·7
Otitis Media	5·6	—
Tonsillitis	1·4	—
Toxic Jaundice	10·8	—
V.D.H.	39·2	—
Other Diseases	4·7*	1·6*
ALL DISEASES	6·5	3·1
ALL DISEASES	6·5	3·1
ALL ACCIDENTS	18·0	4·3
ALL DEATHS	8·1	3·2

*Includes Malignant Neoplasm

§5 ARMY MORTALITY WITH RESPECT TO DISEASE (1943 AND 1944) AND MORTALITY IN THE CIVILIAN POPULATION

WHAT follows is an examination of how army mortality tallies with that of the civilian population, and of what special features are characteristic of army mortality during the years 1943 and 1944. Figures for the Army come from half-yearly analyses of strength and wastage by years of birth, prepared by A.G. Stats. From these, total populations at risk and deaths from sickness or from other causes are separately obtainable for military officers and other ranks, and A.T.S. officers and auxiliaries; but no breakdown by theatre or arm of service is available. Civilian figures for comparison are derived from the Registrar-General's *Annual Statistical Reports* for 1939 and 1940, the last ones published to date. Mortality statistics are usually given as *rates of mortality* from *all* causes, or functions derived therefrom such as standardized death rates, expectations, etc. Army figures referred to above separate deaths due to disease from deaths due to injury by enemy action or otherwise. The former alone furnish any basis for profitable comparisons relevant to the health of the civil and military populations, and figures cited below refer only thereto.

Owing to changes with respect to the lay-out of relevant returns, useful army figures referring to the period before 1943 are not available, whereas the latest figures for England and Wales as a whole are those of 1940. It does not appear likely that this discrepancy will greatly invalidate comparison. Mortality rates tabulated below are *central death rates* per annum w.r.t. sickness alone, i.e. the ratio of deaths to the mean population at risk. The latter is simply the mean of the totals for a given age group at the beginning and end of the calendar year to which the figures refer. The Registrar-General's review gives figures from which they can be computed for quinquennia with respect to the *male* civil population only, as below:

Mean Age of 5-year Age Group	*Central Death Rates per 100,000 (Deaths from sickness only)* 1939	1940	*Percentage Increase*
17½	142	164	15
22½	190	340	79
27½	200	274	37
32½	225	276	22
37½	311	366	18
42½	461	528	15
47½	719	820	14
52½	1,185	1,343	13
57½	1,828	2,099	15

For the youngest age group in the civil population, as for the quinquennia with means of 37½ and over, corresponding central death rates of 1940 are almost exactly 15% higher than those of 1939. For the age range 20-35 the excess is much greater. It would thus appear that the excess mortality of 1940 has two components:

(*a*) An increase of the order of 15% attributable to the stresses of war on the health of the residual population;

(*b*) A further increase due to the selective effect of drafting fitter personnel into the Forces.

The civilian standard mortality adopted for comparison in the following paragraphs is the 1939 mortality increased by 15%; such rates take account of (*a*) but not of (*b*).

Table 18 contrasts the mortality from sickness of other ranks (with standard errors) for the whole two-year period 1943-44 with that of the civilian population in 3-year age groups.

Table 18. Central Death Rates for Male Civilians and Army (Other Ranks)

Age Group	(*a*) *Civilian Central Death Rate* per 100,000	(*b*) *O.Rs. Central Death Rate* per 100,000	(*b*)÷(*a*)
<22	210	121± 7	0·58
22–25	228	185± 6	0·81
25–28	229	195± 6	0·85
28–31	241	197± 6	0·82
31–34	269	190± 7	0·71
34–37	334	192± 8	0·57
37–40	413	200±10	0·48
40–43	527	254±14	0·48
43–46	688	341±26	0·50
46–49	922	377±42	0·41
> 49	1,239*	490±67	0·40

* Taken as age 52

When standardized with reference to age, the civilian and army death rates in this age range are in the ratio 1 : 0·68. Available figures do not disclose how far the lower mortality in the Army is due to the fact that the Army is a selected population, how far it is due to the success of army hygiene, and how far to the possibility that an appreciable proportion of soldiers, who would otherwise die in service, are discharged on medical grounds. With respect to the age group under 25 years, army mortality due to disease increases in successive years of life consistently, as shown in Table 19.

Table 19. Central Death Rates per 100,000 (O.Rs.)

Age	*Jan.-June 43*	*July-Dec. 43*	*Jan.-June 44*	*July-Dec. 44*
18	77	90		
19	86	111	124	93
20	97	114	128	120
21	112	157	137	172
22	142	203	132	203
23	168	204	127	200
24	170	219	151	207
25	194	235	169	238

Without serious error, the standard error of the figures in Table 19 may be taken to lie in the range of 15 to 20. Both in 1943 and in 1944 mortality was lower in the first than in the second half of the year. This is evident from the figures in Table 20. This feature is possibly associated with the fact that the incidence of many diseases in countries overseas rises in the second half of the year.

Table 20. Central Death Rates (O.Rs.) 1943-4

Age Group	1943 *Excess Central Death Rate per 100,000 in 2nd half of year*	*Standard Error (approx.)*	1944 *Excess Central Death Rate per 100,000 in 2nd half of year*	*Standard Error (approx.)*
<22	25	11	–1	13
22–25	49	11	67	11
25–28	56	11	62	13
28–31	39	12	36	13
31–34	55	14	35	14
34–37	45	16	3	15
37–40	6	21	43	19
40–43	6	31	29	27

As compared with those of 1939, female civilian death rates (Table 21) for 1940 show irregular fluctuations, but no striking trend as for males. Hence, unadjusted 1940 figures have been used for comparison with those of A.T.S. as a whole.

The most striking feature of Table 21 is the very low mortality in the A.T.S. as compared with that of military O.Rs. How far this is due to less exacting conditions of service, greater selectivity with reference to intakes, to a lower proportion (as compared with males) of individuals whose discharge is delayed or whose health is impaired by overseas service, and to other less obvious possibilities remains an open question.

Table 21. Central Death Rates (Female)

Age Group	(*a*) *Civilian Death Rate per* 100,000 (*Deaths from sickness only*)	(*b*) *A.T.S. Death Rate per* 100,000 (*Deaths from sickness only*)	*Ratio* (*b*)÷(*a*)
<22	210	53± 6	0·25
22–25	238	35± 5	0·15
25–28	228	40± 10	0·18
28–31	234	86± 20	0·37
31–34	238	92± 27	0·39
34–37	277	80± 32	0·29
37–40	318	180± 60	0·57
40–43	369	178± 73	0·48
43–46	465	165± 82	0·35
>46	650	421±298	0·65

§6 MORTALITY OF THE ARMY AS A WHOLE

THIS section puts on record data referring to the overall contribution of disease, accidental injuries and battle casualties to deaths among British Army Troops throughout the war. They come through non-medical channels, being referable to returns submitted to A.G. Stats (War Office). Deaths in European theatres relate to the period up to V.E. day *viz*: 8th May, 1945. Owing to the absence of the necessary detail, Far Eastern figures for accidental injuries and disease include a certain number of deaths which took place after the end of hostilities. For these and other reasons, totals here cited do not agree exactly with those issued in the White Paper of June, 1946. The relative contributions of disease and injury to deaths among *prisoners of war* is uncertain; deaths attributable to injury, as opposed to disease, have apparently been transferred from the P.W. columns and included under the appropriate theatre; this would not, however, affect the accuracy of the overall figures in the last line of Table 22. With due regard to these reservations, it is safe to assume that more precise information, if available, would not materially alter the general picture disclosed by the tables below.

TABLE 22 **Deaths in the British Army during the War Years**

	CRUDE FIGURES				RELATIVE MORTALITY RATES			
	Killed and Died of Wounds	Died of Injury and Accident	Died of Disease	Total	Killed and Died of Wounds	Died of Injury and Accident	Died of Disease	Total
1. European and Mediterranean Theatres	91,035	16,322	17,983	125,340	72·6	13·0	14·3	100·0
2. Far Eastern Theatres	11,369	1,462	13,619	26,450	43·0	5·5	55·5	100·0
3. At Sea	10,166	135	344	10,645	95·5	1·3	3·2	100·0
4. Prisoners of War			12,638					
5. Total (1+2)	102,404	17,784	31,602	151,790	67·5	11·7	20·8	100·0
6. Total (1+2+3)	112,570	17,919	31,946	162,435	69·3	11·0	19·7	100·0
7. Total (1+2+3+4)	112,570	17,919	44,584	175,073	64·3	10·2	25·5	100·0

TABLE 23 **Breakdown of Figures shown in Table 22**

	CRUDE FIGURES				RELATIVE MORTALITY RATES			
	Killed and Died of Wounds	Died of Injury and Accident	Died of Disease	Total	Killed and Died of Wounds	Died of Injury and Accident	Died of Disease	Total
1. *European and Mediterranean Theatres*								
U.K.	2,633	8,845	10,552	22,030	12·0	40·1	48·0	100·0
France (1939-40)	11,199	378	1,043	12,620	88·7	3·0	8·3	100·0
East Africa	317	87	166	570	55·6	15·3	29·0	100·0
Middle East	12,795	2,086	3,540	18,421	69·5	11·3	19·2	100·0
Persia and Iraq	24	141	250	415	5·8	34·0	60·2	100·0
C.M.F.	30,795	3,027	1,423	35,245	87·4	8·6	4·0	100·0
Balkans and Greece	279	62	23	364	76·6	17·2	6·1	100·0
W. Europe and Southern France	32,672	1,410	429	34,511	94·7	4·1	1·2	100·0
Other European and Mediterranean	321	286	557	1,164	27·6	24·6	47·9	100·0
Total	91,035	16,322	17,983	125,340	72·6	13·0	14·3	100·0
2. *Far Eastern Theatres*								
Malaya	2,634	85	7,796	10,515	25·0	0·8	74·1	100·0
Burma	8,117	262	695	9,074	89·5	2·9	7·7	100·0
India	105	1,052	2,974	4,131	2·5	25·5	72·0	100·0
Other Far Eastern	513	63	2,154	2,730	18·8	2·3	78·9	100·0
Total	11,369	1,462	13,619	26,450	43·0	5·5	51·5	100·0
4. *Prisoners of War*								
Europe			2,624					
Far East			10,014					
Total			12,638					

Part II. ARMY MORBIDITY IN THE U.K.

§1 MORBIDITY AND MAN-DAY WASTAGE w.r.t. HOSPITALIZED DISEASES AND ACCIDENTS

THE information set forth in this Section comes from Hollerith cards based on A.Fs. I1220 (*Hospital Record Cards*). It deals only with (i) the *relative importance of individual diseases, and such groups of diseases as are the province of a particular specialty, as measured by frequency of occurrence, hospital bed requirements and man-days lost to the Army on their account*; (ii) *sex differences w.r.t. such diseases*. Owing to leakage of documentary material, in the main from E.M.S. hospitals, data as a basis for reliable indices of *absolute* morbidity and wastage are not available. In the absence of complete records the most profitable way of extracting useful information is therefore to exhibit figures for particular categories of casualties *relative* to *all* casualties or to casualties of a larger class. In general, diseases shown are those that contribute at least 1% to total morbidity or total wastage. Four such indices appear below:

(i) *Relative Morbidity Rate* (R.M.R.) which is the percentage of hospitalized cases with a given diagnosis among total hospitalized *sick* cases during a given period.

(ii) *Relative Casualty Rate* (R.C.R.) which is the percentage of hospitalized cases of a given specification among *total* hospitalized cases during a given period.

(iii) *Relative Duration of Stay* (R.D.S.) which is the Mean Duration of Stay (M.D.S.) in Hospital and Convalescent Depot for any particular type of hospitalized casualty expressed as a fraction of the M.D.S. for all casualties or for casualties of a larger class.

(iv) *Relative Wastage Rate* (R.W.R.) which measures the proportionate contribution each type of hospitalized casualty makes to total days off duty (in hospital and convalescent depot) caused by casualties of all kinds or by casualties of a larger class, as specified.

Sex Differentials may be calculated from: (*a*) crude relative rates; (*b*) relative rates standardized to allow for the different age composition of military and A.T.S., *i.e.* with military figures adjusted to the level they would reach if the age composition of military personnel were the same as that of the A.T.S. Morbidity differentials of the first sort (*a*) based on crude rates answer the administrative question: is the proportionate contribution of a particular disease to all admissions greater or less among individuals of one sex than among individuals of the other? Differentials of the second sort (*b*) answer the biological question: is the greater proportionate contribution of a particular disease among individuals of one sex associated with the innate or acquired sex make-up as opposed to the preponderance of males or females of particular age groups? Neither the one nor the other indicates whether a particular disease is *actually more prevalent* among individuals of one than among those of the alternate sex or accounts for a greater total loss of man-days to service. An appropriate basis for such comparison is the ratio of the corresponding absolute rates here called the *absolute sex differential.* The estimation of this ratio does not necessarily presuppose exact information with respect to absolute rates of individual diseases. All we need to know is the sex ratio of the absolute rates for *all* diseases. To get the absolute sex differential we have merely to multiply the differential based on relative rates by the ratio of the true total admission rates. Owing to deficiencies of rendering already mentioned, differences w.r.t. absolute admission rates cannot be assessed accurately from A.Fs. I1220; but total admissions to hospital for military and A.T.S. are available in a return (A.F. W3180) consolidated at command level. Though such figures are also defective, there is no sufficient reason for supposing that deficiencies are relatively greater w.r.t. military than to A.T.S. or *vice versa.* Without assuming that absolute admission rates per 1,000 strength calculated from these figures are by any means exact, we may take it that they do sufficiently reflect the *ratio* of male to female admission rates. They show that admissions to hospital w.r.t. disease in 1943 were 8% higher among military than among A.T.S., *i.e.* the adjusting factor defined above is $100/108=0\cdot926$. Admission rates of males and females w.r.t. disease do not greatly differ, but the average duration of stay in hospital and convalescent depot is considerably and consistently higher among males than among females. This may be due in part to the greater degree of "toughening up" men undergo in Convalescent depots before returning to duty and to greater readiness to send A.T.S. home for recuperation. What applies to sex differentials w.r.t. morbidity rates when the end in view is to ascertain the existence of an absolute difference w.r.t. the prevalence of a disease, applies *mutatis mutandis* to sex differentials w.r.t. wastage rates when the end in view is to ascertain the existence of an absolute excess or deficiency of man-days lost to service, and there is therefore no need to elaborate previous remarks to elucidate the method of computing an appropriate adjusting factor which takes into account absolute differences both w.r.t. incidence and w.r.t. mean duration of stay. Ensuing tables (28 and 29) exhibit sex differentials based on absolute as well as on relative rates in conformity with such considerations.

To prevent misunderstanding, it is necessary to make explicit certain defects inherent in the raw materials.

(i) We are entitled to regard relative rates cited as accurate only in so far as we may assume that A.Fs. I1220 *actually received*, although incomplete, constitute a random sample of *all* A.F.s I1220. This assumption calls for qualification. The diagnostic distribution of cases treated in E.M.S. hospitals and those treated in military hospitals is not identical; and deficiency of A.Fs. I1220 is greater w.r.t. cases treated in E.M.S. hospitals than to those treated in military hospitals. In particular, *Psychotic Disorders* and *V.D.* should be treated entirely in military hospitals. Presumably they are therefore less deficient than other categories of disease. However, the bias so introduced (*see Tables* 30-31) is insufficient to change materially the picture which the figures disclose.

(ii) Figures shown here refer only to *hospitalized* cases. Minor sickness treated exclusively in Reception Stations is the topic of §3 below. Without corresponding figures for such cases, our picture of morbidity and wastage cannot be complete. Exclusion of Reception Station cases affects

A.T.S. figures to a greater extent than those w.r.t. military personnel, because the proportion of total A.T.S. cases treated in Reception Stations is much higher than among males. It is well to give due weight to this fact *vis a vis* Sex Differentials in Tables 28 and 29.

(iii) Raw figures refer to cases treated in hospital and convalescent depot in the United Kingdom irrespective of the location of the patient at the date of onset, *i.e.* they include a number of cases evacuated to the United Kingdom from overseas. Thus they do not strictly represent sickness and injury arising exclusively in the United Kingdom. Apart from battle casualties and men with diseases contracted exclusively overseas, *e.g.* Malaria, soldiers with other disabilities are sent home for discharge or for other reasons. These cases go to swell the United Kingdom figures relating to such items as T.B., Psychiatric Disorders, Peptic Ulcers, etc.; but the number of cases received from overseas was small in relation to total United Kingdom cases, and in spite of a different diagnostic distribution, their effect on final relative rates cited was trivial. A sharp rise w.r.t. Malaria figures in the first half of 1944 was not caused primarily by medical evacuation of such cases from overseas but was due mainly to troop movements from malarial regions to the United Kingdom. This resulted in new cases of previously suppressed malaria or relapses arising among troops *after* reaching this country, so exclusion of medical evacuations from overseas would not greatly reduce malaria rates cited.

(iv) Since they refer to a period antedating the reorganization of Army Medical Statistics in the *Directorate of Medical* (*Statistical*) *Research* the figures cited are based on the pre-existing procedure of recording cases by date of receipt of hospital record cards at the War Office. They are therefore unsuitable for the analysis of seasonal movements, since forms received in any given month include cases whose original admission to hospital took place at any point of time ranging from a few days to many months previously; but this is of little importance if the end in view is to cover a period of six months suitably chosen, or a whole year. A separate study of seasonal fluctuations for a selected group of diseases appears in §2 below.

(v) Since this survey is retrospective it relies on Hollerith tabulations prepared before adoption of taxonomical refinements subsequent to the reorganization referred to above. It is therefore necessary to specify that:

(*a*) *gonorrhoea* here connotes urethritis deemed to be of gonococcal origin from *clinical* observation as well as urethritis with G-C smear-positive test;

(*b*) *pneumonia* here includes lobar (pneumoniasis), primary atypical (pneumonitis), and secondary pneumonia, *excluding* influenzal pneumonia and also excluding post-operative cases which would not appear on the hospital record card as a primary diagnosis;

(*c*) *influenza* is a *clinical* diagnosis;

(*d*) figures for *impetigo*, *malaria* and *otitis media* include reinfections and relapses as well as primary attacks;

(*e*) *psychoneuroses* in the left half of tables 24-27 and 30-31 include anxiety state, hysteria and obsessional state. The collective contribution of other more specific diagnoses to the group so denoted is trivial. Under *psychoses*, schizophrenia and the manic depressive type make up almost the entire roll;

(*f*) *all psychiatric disorders*, in addition to psychoneuroses and psychoses as cited in the left half, include *psychopathic personality* and *mental defect* as the only other items of appreciable magnitude. They do *not* include epilepsy, nor sciatica nor effort syndrome.

(*g*) I.D.K., the customary army contraction for *internal derangement of the knee* (*see* also p. 252), is separated from accidents in accordance with long established practice within the service.

(vi) Breakdown by type of hospital in Tables 30 and 31 is governed by codes no longer in use. These show three categories only: (i) cases treated exclusively in military hospitals; (ii) cases treated exclusively in E.M.S. hospitals; (iii) all others, *i.e.* all cases involving transfer to B.R.C.S. hospitals and/or convalescent depots and transfers between military and E.M.S. hospitals. This classification is not wholly satisfactory for any purpose. In particular, the hospital distribution of diseases which generally involve convalescence is concealed by the very high proportion shown in class (iii). Nor is comparison strictly valid between duration of stay of a given disease treated exclusively in military hospitals and that of the same disease treated exclusively in E.M.S. hospitals, since the regulations governing the return of a soldier direct to unit as opposed to transfer to a B.R.C.S. auxiliary hospital or convalescent depot differed w.r.t. military and E.M.S. hospitals.

As stated, some imperfections with respect to documentary sources, methods of compilation and diagnostic breakdown arise mainly from the time when available raw materials were assembled. Though relevant to a proper appreciation of the tables below and comments thereon, the limitations set forth are not such as to lead to a gross distortion of the true state of affairs, in so far as our objective is to present a picture of morbidity and wastage of hospitalized cases in the United Kingdom which is representative within sufficiently narrow limits for the end in view. What value such analysis may have depends on how far it contributes to solution of problems arising in day to day medical administration and of problems which beset the progress of medical science, more especially in relation to army needs. Composite figures for groups of diseases connected by no less exiguous similarity than anatomical site subserve the uses of neither one nor the other. Accordingly, ensuing tables, as elsewhere in this Report, exhibit disease groups only in so far as they fall within the province of specialties for which medical administration has to make provision.

Morbidity and Wastage—Military Personnel

Crude Relative Morbidity Rates w.r.t. military personnel for each of three 6-monthly periods appear in *Table* 24. Throughout this section the number of cases used as a basis for relative rates is so large that standard errors w.r.t. sampling are very small in relation to the rates themselves, and it is therefore unnecessary to cite them. Since the age-composition of the Army changed little during the period covered we may compare directly figures for the three 6-monthly intervals. PSYCHIATRIC DISORDERS, of which the great majority are Psychoneuroses, come first. They make up about 6% of all sick cases. In the first half-year the GONORRHOEA figure exceeded that for Psychiatric Disorders but it fell sharply as treatment of Gonorrhoea in unit lines came into force. TONSILLITIS maintains a steady level of 4% to 5% of all sickness and HERNIA comes next at a rather lower level. A rise w.r.t. Tuberculosis and Psychiatric Disorders is probably due to increased evacuation of such cases from Overseas, and a spectacular rise of the Malaria figure in the first half of 1944 follows the return to the United Kingdom of troops who had been serving in malarial areas. The residual group of *Other Diseases* includes a large number of separate diseases whose individual contribution to the total is relatively small. Among Specialist Groups nearly 1 in 10 of all United Kingdom hospitalized cases is a SKIN case and 1 in 12 belongs to the E.N.T. group.

As already emphasized, Wastage Rates disclose a clearer picture of effective loss on account of sickness than do

Morbidity Rates ; but Wastage Rates do not tell the whole story. Measured by loss of man-days, wastage would be identical whether caused by 50 cases with an average stay of 40 days in hospital or by 200 cases with an average stay of 10 days. In practice, the latter would interfere more seriously with the activities of a unit. Thus frequency of occurrence (*Morbidity Rates*), as well as man-days lost (*Wastage Rates*), contributes to a comprehensive assessment of the importance of a disease as a source of loss to the Army. Accordingly, both indices appear in *Table* 25 together with the connecting factor, *viz. Relative Duration of Stay* in hospital and convalescent depot. They also appear in *Chart* 6 which shows a comparison of the relative contribution of certain diseases to total morbidity and to total sick wastage among both males and females.

Owing to its protracted treatment in medical units HERNIA emerges as the largest single cause of man-day wastage among military personnel in the U.K. It makes up exactly 10% of all days lost on account of sickness. This is even higher than the corresponding figure for the sum of ALL PSYCHIATRIC DISORDERS. Following these two items in the hierarchy of wastage come I.D.K. and APPENDICITIS each requiring a long stay in medical units and each contributing 4% to the total sick figure. Gonorrhoea and Tonsillitis, which are major items w.r.t. morbidity, are much less important as sources of man-day loss because hospital treatment for these diseases is relatively short. Among Specialist Disease Groups recorded, Diseases of Skin and E.N.T., both requiring relatively short hospital and convalescent depot treatment, yield to PSYCHIATRIC DISORDERS as the largest group w.r.t. days lost to service. ACCIDENTS, which make up one-seventh of all hospitalized cases, are the cause of over *one-fifth* of total days off duty on account of sickness and injury. The mean stay in hospital and convalescent depot for *All Diseases* and *All Casualties* appears (in days) at the foot of the column for *Relative Duration of Stay*. Thus the R.D.S. is convertible into the actual stay in days by simple multiplication, if the latter is requisite. Total medical wastage figures derived from another source (A.F. W3180) show that a soldier in the United Kingdom spent an average of nearly 11 days or 3% of his time during 1943 in hospital and/or convalescent depot. Eight and a half of these 10½-11 days are attributable to sickness and 2¼ to accidents.

Morbidity and Wastage—A.T.S.

A.T.S. figures disclose a totally different picture (*Table* 26 and right-hand side of *Chart* 6). TONSILLITIS heads the morbidity list with over 8% of all hospitalized sick cases, and APPENDICITIS comes second with about 6%. All Psychiatric Disorders together make up considerably less than either of these items. Scabies shows a high rate during the first half-year ; but declines steeply as treatment in unit lines was introduced for women as well as for men. Gonorrhoea falls sharply presumably for the same reason as that applicable to males. Among Specialist Groups the two largest are DISEASES OF THE GENITO-URINARY SYSTEM and DISEASES OF EAR, NOSE AND THROAT. Between them, they make up over one-quarter of all hospitalized cases. Major items w.r.t. wastage among A.T.S. (*Table* 27 and *Chart* 6) are APPENDICITIS which makes up nearly *one-tenth* of all days in hospital on account of sickness and PSYCHIATRIC DISORDERS and TONSILLITIS which each amount to 6%. No other single item contributes more than 3% to the total sick figure. DISEASES OF THE GENITO-URINARY SYSTEM and of E.N.T. maintain their position at the head of specialist groups w.r.t. man-day wastage as w.r.t. morbidity, but they make up a smaller percentage of total wastage than of morbidity. ACCIDENTS account for less than one-tenth of all days spent by A.T.S. in hospitals and Convalescent depots. Total medical wastage in hospital and convalescent depot was 5½ days for each auxiliary a year. This is equivalent to 1½% of available time. Of these 5½ days, 5 were due to sickness and ½ to accidents. These figures are substantially lower than those w.r.t. military personnel ; but part of the difference would be offset by greater use of reception stations among A.T.S. compared with military personnel.

Sex Differentials

Explanatory remarks above suffice to specify the significance of the various Sex Differentials shown in *Tables* 28 and 29. They refer to a more limited list of diseases than that in Tables 24-27. Some striking facts emerge from sex comparison w.r.t. Morbidity (*Chart* 7). Figures in column 4 of *Table* 28 are primarily of administrative interest in so far as they represent Sex Differentials on the basis of relative rates that actually prevailed ; but figures in column 5 are of greater biological interest since they eliminate the influence of differences attributable to differences w.r.t. age composition of the two populations in contradistinction to differences attributable to innate or acquired peculiarities of the sex make-up. Columns 6 and 7 introduce the adjustments necessary to clarify *absolute* differences w.r.t. the level of admission rates among military and A.T.S.

Certain conclusions emerge from the use of any one of the indices cited. APPENDICITIS is between 2 and 3 times as common among A.T.S. as among Army personnel. SCARLET FEVER is between 2⅔ and 1½ times as frequent and TONSILLITIS is about 1½ times as common in the A.T.S. It is not surprising that HERNIA rates among females are less than one-tenth of the corresponding figures for males. The female PEPTIC ULCER rates are between one-fifth and one-tenth those of the male, IMPETIGO between one-third and one-quarter, GONORRHOEA and SYPHILIS respectively one-quarter and one-half. The effect of the adjustments incorporated in the last three columns as compared with differentials shown in column 4 is interesting. Crude Relative Rates for *Appendicitis* are nearly 3 times as high among A.T.S. as among military personnel. After due allowance for differences w.r.t. age composition of the two populations, the ratio of A.T.S. to the male relative rate falls to 2¼ to 1. How far this reflects a true sex difference is the subject of discussion at a later stage (p. 249). The corresponding *absolute* differentials as defined above are: crude, 2¾ : 1 and standardized w.r.t. age, 2 : 1. Similar remarks apply to the A.T.S. excess w.r.t. *Scarlet Fever*. The ratio of the crude relative rates is over 2½ : 1 ; and that of the absolute rates standardized w.r.t. age is 1½ : 1. *Reduction* of sex differences w.r.t. crude relative rates by use of different indices exhibited in the table applies also to diseases for which the A.T.S. rate is lower than that of the male. Thus the crude relative A.T.S. rate for *Peptic Ulcer* is only one-tenth of the corresponding figure for males ; but the standardized absolute rate is one-fifth. Even so, the difference is striking ; and tallies with figures already cited in Part I § 1 w.r.t. Medical Discharges. Contrariwise, indices in columns 5, 6 and 7 may emphasize sex differences w.r.t. crude relative rates, as is true of *Impetigo*, *Pneumonia* and *Infective Hepatitis*. After eliminating differences w.r.t. age, the incidence of the last named among A.T.S. is little over a half that among military personnel. Both the crude relative rate and the crude absolute rate w.r.t. BRONCHITIS for A.T.S. are appreciably below the corresponding rates for military personnel ; but the effect of age standardization is to raise the A.T.S. rate well above that of military personnel. However, the recorded divergence between crude and standardized differentials may in this case be somewhat excessive, since the correction factor *here* used for age-standardization was based on *chronic* bronchitis cases whereas morbidity rates refer to *all*. Since there is

good reason to believe that the incidence of residual cases among males does not rise so steeply in the higher age groups as it does w.r.t. chronic bronchitis, the appropriate correction to the crude male rate should be less than that actually used, hence the use of italics in Tables 28 and 29. Even so, we are still likely to arrive at a female rate higher than the figure for males. Sex differentials based on invalidings show that the A.T.S. rate is considerably *below* the army figure even after age-standardization. This difference between discharge and morbidity sex differentials suggests: (*a*) that the incidence of the more serious type of bronchitis (*i.e.* cases leading to discharge) is higher among men; (*b*) the reverse is true of the milder cases that do not involve discharge.

Comparison between age-standardized *absolute* sex-differentials w.r.t. morbidity in the United Kingdom and corresponding differentials for invalidings (all theatres) is suggestive. With respect to T.B. and Peptic Ulcer, both of which almost invariably lead to discharge, the ratio of military to A.T.S. rates is higher for the United Kingdom morbidity than for invaliding. Two circumstances may account for this: (i) whereas United Kingdom morbidity figures for military personnel are somewhat swollen by inclusion of cases evacuated to the United Kingdom for invaliding, a negligible proportion of A.T.S. were then serving abroad; (ii) soldiers selected for overseas service come from the higher medical categories. For both reasons one would expect such diseases to be more frequent among residual United Kingdom troops than among total army personnel. With respect to *Psychiatric Disorders* the A.T.S. morbidity rate is rather lower than the military, but the A.T.S. discharge rate is *twice the corresponding figure* w.r.t. military personnel. Circumstances mentioned above may partly account for this; but it is probable that the higher A.T.S. discharge rate is largely due to an administrative procedure mentioned in a previous context, namely, greater reluctance to dispense with the services of a soldier, and hence adoption of different standards for men and women by medical boards.

The effect of age-standardization on relative rates w.r.t. wastage as for corresponding morbidity rates may be either to increase or to decrease a sex differential. This, of course, depends on the relative age-incidence distribution of the disease itself. *Absolute* wastage sex-differentials take into account both higher hospital admission rates among males, and the *higher average stay of males in hospital and convalescent depot* (37·4 days for males and 23·8 days for females). Naturally this has the effect of making the ratio of absolute wastage figures w.r.t. females and males considerably lower than the corresponding ratio for relative rates. To a certain extent such differences may be offset by relatively greater loss to duty among A.T.S. in reception stations or on sick leave at home; and it is also possible that longer stay of army cases in medical units is largely attributable to administrative considerations *e.g.* need to ensure a high degree of fitness among soldiers before they can return to full duty. Thus auxiliaries rarely go to a convalescent depot where the soldier may undergo a toughening-up regimen. The most appropriate sex differential depends on the purpose it is intended to serve. For assessing actual man-day wastage in medical units per 1,000 strength the figures in column 6 of *Table* 29 are most revealing; for a similar comparison with due regard to differences of age composition, column 7 is appropriate, but columns 4 or 5 are more suitable for comparison of the *relative* importance of a particular disease as a source of wastage among females and males.

A striking feature of *Table* 29 and of *Chart* 8 is the extent to which the adjustments incorporated in columns 5, 6 and 7 reduce spectacular excesses of crude relative wastage rates for females over the corresponding rates for males. The sex differential based on *crude relative* wastage rates for SCARLET FEVER is nearly 3 : 1 (A.T.S. : Military). Age-standardization reduces this to less than 2 : 1. The *crude absolute* rates are $1\frac{3}{8}$: 1 and the *standardized absolute* rates for the two sexes are about the same. Corresponding figures for TONSILLITIS, APPENDICITIS and TUBERCULOSIS (other than pulmonary) follow the same trend. Indeed, Standardized Absolute Wastage Rates for A.T.S. never exceed those for military by more than 12%. When we have eliminated the effect of differences w.r.t. age composition, the following conclusions (column 7) emerge:

(i) for every day lost to service by the A.T.S. in hospital and convalescent depot on account of HERNIA, military personnel lose 25 days in these units;

(ii) for every day lost to A.T.S. through IMPETIGO, military personnel lose 5 days;

(iii) hospital wastage on account of PEPTIC ULCER in the army is 4 times as high as in the A.T.S.; w.r.t. PNEUMONIA and INFECTIVE HEPATITIS the corresponding ratio is 3 : 1 and for PSYCHIATRIC DISORDERS, GONORRHOEA and OTITIS MEDIA roughly 2 : 1;

(iv) the net excess of male over female wastage rates w.r.t. disease is such that a soldier spends approximately one and three-quarter days in hospital and convalescent depot for every day likewise lost to service by sickness among A.T.S.

Distribution of Cases by Type of Hospital

With due regard to limitations of the hospital classification, as stated above, the main facts that emerge from *Tables* 30-31 are the following. Of all military other rank sick cases treated in hospital in the United Kingdom in 1943, approximately one-half were treated exclusively in military hospitals, one-quarter in E.M.S. hospitals and one-quarter involved transfer to B.R.C.S. auxiliary hospitals and/or convalescent depots, or movement between military and civil hospitals. The proportion cited for E.M.S. hospitals is probably lower than the true figure owing to greater deficiency of A.Fs. I1220 from E.M.S. hospitals. Among Accidental Injuries, a higher proportion involved use of convalescent depots. *Gonorrhoea* and *Syphilis* were treated almost entirely in military hospitals. About two-thirds of *Skin* conditions were treated exclusively in military hospitals and a similar proportion of *Eye Diseases*. As delineated in the Army Diagnosis Code, Psychosis should be treated exclusively in military hospitals. A rather surprising figure (20%) w.r.t. *Psychotic* cases in E.M.S. hospitals is possibly attributable to a less restricted use of the term by civilian physicians. *Influenza* is the only recorded disease treated predominantly (nearly two-thirds of all hospitalized cases) in E.M.S. hospitals. Contrariwise, most cases of *Common Cold and Coryza* were dealt with in military hospitals. Here again, an apparent difference of procedure may well be, at least in part, merely a difference of nomenclature. Ninety per cent. of *Hernia* cases involved transfer to convalescence or transfer between types of hospital, as did three-quarters of *Appendicitis* and *Pneumonia* cases, two-thirds of men with *I.D.K.* and half the *Infective Hepatitis* cases. Real differences w.r.t. mean duration of stay in military and E.M.S. hospitals are obscured and probably distorted by the high proportion of cases in the rather heterogeneous Class III. Owing to different administrative procedures affecting stay in military and civil hospitals and dispatch therefrom to B.R.C.S. hospitals or convalescent depots, we are not necessarily entitled to regard residual cases in Classes I and II as strictly comparable. Only when Class III includes a small proportion of total cases, *i.e.* the great majority of cases are treated exclusively in military hospitals or ex-

clusively in civil hospitals, is there a legitimate basis for comparison. With respect to such diseases, stay in civil hospitals is appreciably higher than in military hospitals. The following figures for military other ranks indicate the extent of the difference.

Mean Stay in Military and E.M.S. Hospitals in the United Kingdom (Military Other Ranks—1943)

	I *Treated Exclusively in Military Hospitals*	*II* *Treated Exclusively in E.M.S. Hospitals*
Common Cold and Coryza	8·7 days	12·1 days
Influenza	10·7 "	13·2 "
Scabies	13·4 "	18·1 "
Impetigo	18·5 "	21·3 "
Tonsillitis	11·8 "	14·9 "
Dyspepsia and Gastritis	16·0 "	20·9 "

	Excess of II over I (in days)	*Excess of II over I (as percentage)*
Common Cold and Coryza	3·4 days	39%
Influenza	2·5 "	23%
Scabies	4·7 "	35%
Impetigo	2·8 "	15%
Tonsillitis	3·1 "	26%
Dyspepsia and Gastritis	4·9 "	31%

All the above are minor diseases and hence unlikely to be affected by administrative procedures relevant to ultimate disposal. So unless there is reason to believe that civil hospitals received more serious cases we can say with confidence that there was (1943) a real difference between the mean stay in E.M.S. hospitals and in military hospitals, at least w.r.t. the diseases cited in this table. The excess in E.M.S. hospitals ranged from 15% to 40%.

Summary

With due regard to limitations discussed above the main conclusions which emerge from the preceding analysis are the following:

(*a*) Most frequent causes of admission to hospital on account of *sickness* among military personnel in the United Kingdom in 1943 were PSYCHIATRIC DISORDERS which made up 6% of all sick cases, GONORRHOEA and TONSILLITIS (5% each), HERNIA (4%) and BRONCHITIS (3%). ACCIDENTAL INJURIES accounted for *one-seventh* of *all* hospitalized cases. Major sources of *wastage, i.e.* man-days in hospital and convalescent depot on account of sickness were HERNIA (10%), PSYCHIATRIC DISORDERS (8½%), I.D.K. and APPENDICITIS (4% each).

(*b*) Among A.T.S. in the same year TONSILLITIS accounted for 8½% of sick hospital cases, APPENDICITIS made up 6% and PSYCHIATRIC DISORDERS, 4%. Main items in the hierarchy of wastages were APPENDICITIS (9%), TONSILLITIS and PSYCHIATRIC DISORDERS (6% each).

(*c*) Comparison of males and females shows that A.T.S. morbidity rates considerably exceed corresponding military figures w.r.t. APPENDICITIS, SCARLET FEVER and TONSILLITIS. In each case the differential based on crude relative rates is considerably higher than the corresponding differential adjusted to eliminate differences w.r.t. age composition. This in turn is higher than the differential based on age-standardized *absolute* rates. A.T.S. rates are much lower than military w.r.t. HERNIA, PEPTIC ULCER, IMPETIGO and GONORRHOEA.

(*d*) On an average each soldier in the United Kingdom spent nearly 11 days or 3% of his time in hospital and convalescent depot—8½ days on account of DISEASE and 2½ as a result of ACCIDENTAL INJURIES. Corresponding A.T.S. figures were: DISEASE: 5 days, ACCIDENTAL INJURIES: ½ day.

(*e*) Of all hospitalized sick cases in the United Kingdom in 1943 approximately one-half were treated exclusively in military hospitals, one-quarter in E.M.S. hospitals and one-quarter involved transfer to B.R.C.S. auxiliary hospitals or convalescent depots, or movement between military and E.M.S. hospitals. Where reasonably valid comparison between stay in military and E.M.S. hospitals is possible, the evidence suggests that mean stay in E.M.S. hospitals is about 25% higher than in military hospitals.

TABLE 24 **Relative Morbidity and Casualty Rates of Hospitalized Cases in the U.K.; Military Personnel; January 1943—June 1944**

INDIVIDUAL DISEASES	Relative Morbidity Rates		
	1st Half 1943	2nd Half 1943	1st Half 1944
Psychoneuroses	*3·7*	*4·8*	*4·5*
Psychoses	*0·7*	*1·0*	*1·0*
Other Psychiatric Disorders	*0·7*	*0·9*	*0·9*
All Psychiatric Disorders	5·1	6·7	6·4
Gonorrhoea	5·6	5·0	2·8
Tonsillitis	4·7	4·7	4·2
Hernia	4·1	4·2	3·4
Bronchitis	3·8	2·8	3·1
Impetigo	3·0	2·8	2·4
Varicose Veins	2·7	2·5	2·2
Common Cold	2·6	2·5	1·6
Dyspepsia and Gastritis	2·5	2·5	2·1
Rheumatic Conditions (excluding Rheumatic Fever): Non-Articular	2·3	2·1	2·1
Rheumatic Conditions (excluding Rheumatic Fever): Articular	0·4	0·4	0·4
Appendicitis	1·9	2·1	1·8
Influenza	1·9	2·0	1·9
Pneumonia	2·0	1·7	2·2
I.D.K.	1·8	1·7	1·8
Haemorrhoids	1·6	1·6	1·4
Infective Hepatitis	1·5	1·3	1·4
Synovitis and Arthritis	1·4	1·4	1·3
Boils and Carbuncles	1·3	1·5	1·3
Peptic Ulcer	1·3	1·4	1·5
Syphilis	1·2	1·3	1·2
Toxic Jaundice	0·6	0·7	0·5
Otitis Media	1·2	1·1	1·4
Scabies	1·1	0·7	0·7
T.B.—Pulmonary	0·7	0·9	1·2
T.B.—Other Sites	0·1	0·2	0·2
Sciatica	0·6	0·7	0·8
Malaria	0·3	0·5	5·3
Scarlet Fever	0·3	0·3	0·4
Nephritis	0·1	0·2	0·2
All Other Diseases	42·1	42·8	43·0
ALL DISEASES	100·0	100·0	100·0

SPECIALIST GROUPS	Relative Casualty Rates		
	1st Half 1943	2nd Half 1943	1st Half 1944
All Diseases of Skin (excluding Areolar Tissue)	9·3	9·1	8·5
All Diseases of E.N.T.	8·4	7·9	7·7
All Psychiatric Disorders	4·4	5·6	5·3
All Diseases of Genito-Urinary System	4·2	4·2	4·3
All Diseases of M.T.G.	1·6	1·5	1·1
All Diseases of Eye	1·4	1·4	1·4
All Other Diseases	56·3	53·8	55·2
ALL DISEASES	85·6	83·4	83·5
ALL ACCIDENTS	13·8	15·0	14·3
ALL BATTLE CASUALTIES	0·6	1·6	2·1
ALL CASES	100·0	100·0	100·0

TABLE 25 Relative Morbidity, Wastage and Duration of Stay of Hospitalized Cases in the U.K.; Military Personnel; 1943

INDIVIDUAL DISEASES	1943 R.M.R.	1943 R.W.R.	1943 R.D.S.
Psychoneuroses	*4·2*	*5·8*	*1·4*
Psychoses	*0·9*	*1·7*	*2·0*
Other Psychiatric Disorders	*0·8*	*1·1*	*1·3*
All Psychiatric Disorders	5·9	8·6	1·5
Gonorrhoea	5·3	2·2	0·4
Tonsillitis	4·7	2·8	0·6
Hernia	4·1	10·0	2·4
Bronchitis	3·3	2·9	0·9
Impetigo	2·9	1·8	0·6
Varicose Veins	2·6	2·6	1·0
Common Cold	2·5	0·8	0·3
Dyspepsia and Gastritis	2·5	1·9	0·8
Rheumatic Conditions : Non-Articular	2·2	2·4	1·1
(excluding Rheumatic Fever) : Articular	0·4	0·6	1·3
Appendicitis	2·0	3·8	1·9
Influenza	1·9	1·0	0·5
Pneumonia	1·8	3·5	1·9
I.D.K.	1·7	4·1	2·4
Haemorrhoids	1·6	1·7	1·1
Infective Hepatitis	1·4	1·8	1·2
Synovitis and Arthritis	1·4	1·9	1·4
Boils and Carbuncles	1·4	1·0	0·7
Peptic Ulcer	1·3	1·3	1·0
Syphilis	1·2	0·8	0·7
Toxic Jaundice	0·6	0·7	1·2
Otitis Media	1·2	1·1	1·0
Scabies	0·9	0·4	0·5
T.B.—Pulmonary	0·8	1·2	1·6
Other Sites	0·2	0·3	2·0
Sciatica	0·7	1·2	1·9
Malaria	0·4	0·3	0·9
Scarlet Fever	0·3	0·4	1·2
Nephritis	0·1	0·2	1·7
All Other Diseases	42·4	36·3	0·9
ALL DISEASES	100·0	100·0	1·0 (37·4 days)

SPECIALIST GROUPS	1943 R.C.R.	1943 R.W.R.	1943 R.D.S.
All Diseases of Skin (excl. Areolar Tissue)	9·2	6·3	0·7
All Diseases of E.N.T.	8·2	5·3	0·7
All Psychiatric Disorders	5·0	6·6	1·3
All Diseases of Genito-Urinary System	4·2	3·7	0·9
All Diseases of M.T.G.	1·5	0·7	0·5
All Diseases of Eye	1·4	1·0	0·7
All Other Diseases	55·1	54·0	1·0
ALL DISEASES	84·5	77·7	0·9
ALL ACCIDENTS	14·4	20·9	1·5
ALL BATTLE CASUALTIES	1·1	1·4	1·3
ALL CASES	100·0	100·0	1·0 (40·6 days)

§1 (*contd.*) MORBIDITY AND MAN-DAY WASTAGE w.r.t. HOSPITALIZED DISEASES AND ACCIDENTS

TABLE 26 **Relative Morbidity and Casualty Rates of Hospitalized Cases in the U.K.; A.T.S.; January 1943—June 1944**

INDIVIDUAL DISEASES	Relative Morbidity Rates		
	1st Half 1943	2nd Half 1943	1st Half 1944
Tonsillitis	8·4	8·3	8·3
Appendicitis	5·1	6·7	5·0
Psychoneuroses	*2·4*	*3·5*	*2·7*
Psychoses	*0·7*	*0·9*	*0·7*
Other Psychiatric Disorders	*0·3*	*0·5*	*0·2*
All Psychiatric Disorders	3·4	4·9	3·6
Scabies	5·0	1·2	0·4
Rheumatic Conditions : Non-Articular	3·0	2·6	3·1
(excluding Rheumatic Fever) : Articular	0·1	0·1	0·2
Bronchitis	3·5	2·0	2·6
Common Cold	2·4	2·8	1·9
Influenza	2·1	2·1	2·2
Gonorrhoea	1·6	1·3	0·8
Dyspepsia and Gastritis	1·2	1·3	1·0
Varicose Veins	1·1	1·4	1·3
Pneumonia	1·4	1·0	1·2
Impetigo	1·0	1·0	0·8
Infective Hepatitis	1·1	1·0	0·7
Otitis Media	1·2	0·8	1·4
Scarlet Fever	0·9	0·7	1·3
Boils and Carbuncles	0·7	0·8	0·8
T.B.—Pulmonary	0·5	0·9	1·1
Other Sites	0·2	0·3	0·4
Syphilis	0·7	0·7	0·5
Toxic Jaundice	0·0	0·1	0·1
Synovitis and Arthritis	0·5	0·7	0·6
Haemorrhoids	0·5	0·5	0·4
Hernia	0·3	0·4	0·3
I.D.K.	0·2	0·4	0·3
Sciatica	0·3	0·3	0·4
Peptic Ulcer	0·1	0·2	0·2
Nephritis	0·1	0·1	0·1
Malaria	—	—	—
All Other Diseases	53·1	55·5	58·9
ALL DISEASES	100·0	100·0	100·0

SPECIALIST GROUPS	Relative Casualty Rates		
	1st Half 1943	2nd Half 1943	1st Half 1944
All Diseases of Genito-Urinary System	12·1	14·6	14·6
All Diseases of E.N.T.	12·7	11·9	12·8
All Diseases of Skin (excluding Areolar Tissue)	4·8	5·2	4·4
All Psychiatric Disorders	3·2	4·5	3·3
All Diseases of M.T.G.	1·9	1·9	1·7
All Diseases of Eye	0·8	0·8	0·8
All Other Diseases	57·4	53·8	54·7
ALL DISEASES	93·0	92·6	92·3
ALL ACCIDENTS	6·9	7·4	7·7
ALL BATTLE CASUALTIES	0·0	0·0	0·0
ALL CASES	**100·0**	**100·0**	**100·0**

TABLE 27 **Relative Morbidity, Wastage and Duration of Stay of Hospitalized Cases in the U.K.; A.T.S.; 1943**

INDIVIDUAL DISEASES	1943 R.M.R.	1943 R.W.R.	1943 R.D.S.
Tonsillitis	8·4	6·2	0·7
Appendicitis	5·9	9·0	1·5
Psychoneuroses	*3·0*	*3·6*	*1·2*
Psychoses	*0·8*	*2·1*	*2·5*
Other Psychiatric Disorders	*0·4*	*0·5*	*1·4*
All Psychiatric Disorders	4·2	6·2	1·5
Scabies	3·1	0·8	0·2
Rheumatic Conditions : Non-Articular	2·8	3·2	1·1
(excluding Rheumatic Fever) : Articular	0·1	0·2	1·7
Bronchitis	2·7	2·5	0·9
Common Cold	2·6	1·1	0·4
Influenza	2·1	1·4	0·7
Gonorrhoea	1·4	2·1	1·4
Dyspepsia and Gastritis	1·3	0·9	0·8
Varicose Veins	1·2	1·1	0·9
Pneumonia	1·2	2·0	1·7
Impetigo	1·0	0·8	0·8
Infective Hepatitis	1·0	1·2	1·2
Otitis Media	1·0	1·1	1·1
Scarlet Fever	0·8	1·0	1·3
Boils and Carbuncles	0·7	0·6	0·8
T.B.—Pulmonary	0·7	2·1	3·0
Other Sites	0·3	0·7	2·7
Syphilis	0·7	1·1	1·7
Toxic Jaundice	0·0	0·1	1·8
Synovitis and Arthritis	0·6	1·0	0·6
Haemorrhoids	0·5	0·5	1·0
Hernia	0·4	0·8	2·2
I.D.K.	0·3	0·7	2·1
Sciatica	0·3	0·6	2·2
Peptic Ulcer	0·1	0·3	1·9
Nephritis	0·1	0·2	2·3
Malaria	—	—	—
All Other Diseases	54·3	50·4	0·9
ALL DISEASES	100·0	100·0	1·0 (23·8 days)

SPECIALIST GROUPS	1943 R.C.R.	1943 R.W.R.	1943 R.D.S.
All Diseases of Genito-Urinary System	13·4	12·5	0·9
All Diseases of E.N.T.	12·3	9·8	0·8
All Diseases of Skin (excl. Areolar Tissue)	5·0	4·5	0·9
All Psychiatric Disorders	3·9	5·6	1·4
All Diseases of M.T.G.	1·9	1·1	0·6
All Diseases of Eye	0·8	0·8	1·0
All Other Diseases	55·6	56·4	1·0
ALL DISEASES	92·8	90·7	1·0
ALL ACCIDENTS	7·1	9·3	1·3
ALL BATTLE CASUALTIES	0·0	0·1	1·8
ALL CASES	100·0	100·0	1·0 (24·3 days)

TABLE 28

Sex Differences w.r.t. Morbidity ; Hospitalized Cases in the U.K; 1943

DISEASE	A.T.S.	MILITARY		SEX DIFFERENTIALS A.T.S. : MILITARY			
	(1)	Relative Morbidity Rate (2)	(3)	Relative Rate (4)	(5)	Absolute Rate (6)	(7)
	Crude R.M.R.	Crude	Standardized	Crude (1)÷(2)	Standardized (1)÷(3)	Crude	Standardized
Tonsillitis	8·35	4·70	5·26	1·78	1·59	1·64	1·41
Appendicitis	5·91	2·00	2·58	2·96	2·29	2·73	2·03
All Psychiatric Disorders	4·17	5·87	4·51	0·71	0·92	0·66	0·82
*Bronchitis**	*2·74*	*3·32*	*1·74*	*0·83*	*1·57*	*0·77*	*1·40*
Gonorrhoea	1·45	5·30	5·06	0·27	0·29	0·25	0·25
Pneumonia	1·17	1·85	2·14	0·63	0·55	0·58	0·49
Impetigo	1·04	2·94	4·22	0·35	0·25	0·32	0·22
Infective Hepatitis	1·03	1·43	1·68	0·72	0·61	0·66	0·54
Otitis Media	1·00	1·17	1·28	0·85	0·78	0·78	0·69
Scarlet Fever	0·77	0·29	0·44	2·66	1·75	2·46	1·57
T.B. Pulmonary	0·70	0·78	0·74	0·90	0·95	0·83	0·84
Other Sites	0·26	0·17	0·20	1·53	1·30	1·41	1·18
Syphilis	0·68	1·24	1·14	0·55	0·60	0·51	0·53
Hernia	0·35	4·15	4·16	0·08	0·08	0·07	0·07
Peptic Ulcer	0·15	1·34	0·68	0·11	0·22	0·10	0·19
Nephritis	0·09	0·14	0·12	0·64	0·75	0·59	0·64
All Other Diseases	70·14	63·31	64·05	1·11	1·10	1·02	0·97
ALL DISEASES	100·00	100·00	100·00	1·00	1·00	0·92	0·89

*See note on Sex Differentials above.

TABLE 29

Sex Differences w.r.t. Wastage ; Hospitalized Cases in the U.K.; 1943

DISEASE	A.T.S.	MILITARY		SEX DIFFERENTIALS A.T.S. : MILITARY			
		Relative Wastage Rate		Relative Rate		Absolute Rate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Crude R.W.R.	Crude	Standardized	Crude (1)÷(2)	Standardized (1)÷(3)	Crude	Standardized
Tonsillitis	6·19	2·79	3·12	2·22	1·98	1·31	1·12
Appendicitis	8·95	3·83	4·93	2·34	1·82	1·38	1·02
All Psychiatric Disorders	6·19	8·55	6·56	0·72	0·94	0·42	0·53
*Bronchitis**	*2·49*	*2·89*	*1·51*	*0·86*	*1·65*	*0·51*	*0·93*
Gonorrhoea	2·06	2·25	2·15	0·92	0·96	0·54	0·54
Pneumonia	2·03	3·45	3·98	0·59	0·51	0·35	0·29
Impetigo	0·83	1·83	2·63	0·45	0·32	0·26	0·18
Infective Hepatitis	1·19	1·77	2·07	0·67	0·57	0·39	0·32
Otitis Media	1·08	1·14	1·24	0·95	0·87	0·56	0·49
Scarlet Fever	1·01	0·36	0·54	2·81	1·87	1·65	1·05
T.B. Pulmonary	2·11	1·24	1·17	1·70	1·80	1·00	1·01
Other Sites	0·71	0·34	0·40	2·09	1·78	1·23	0·99
Syphilis	1·13	0·85	0·78	1·33	1·45	0·78	0·81
Hernia	0·76	10·02	10·04	0·08	0·08	0·05	0·04
Peptic Ulcer	0·29	1·34	0·68	0·22	0·43	0·13	0·24
Nephritis	0·21	0·24	0·22	0·88	0·95	0·52	0·54
All Other Diseases	62·77	57·11	57·98	1·10	1·08	0·65	0·61
ALL DISEASES	100·00	100·00	100·00	1·00	1·00	0·59	0·56

* See note on Sex Differentials above.

TABLE 30 **Distribution of Cases by Type of Hospital; Military Personnel; 1943**

INDIVIDUAL DISEASES	Relative Hospitalization Rates			
	I	II	III	Total
Psychoneuroses	*50·3*	*32·0*	*17·7*	*100·0*
Psychoses	*69·8*	*20·3*	*10·0*	*100·0*
Other Psychiatric Disorders	*71·1*	*18·0*	*10·9*	*100·0*
All Psychiatric Disorders	56·0	28·4	15·6	100·0
Gonorrhoea	96·9	1·1	2·1	100·0
Tonsillitis	41·2	35·5	23·2	100·0
Hernia	6·2	3·5	90·3	100·0
Bronchitis	37·8	30·3	31·9	100·0
Impetigo	69·7	21·7	8·6	100·0
Varicose Veins	33·1	28·7	38·2	100·0
Common Cold	60·3	29·3	10·4	100·0
Dyspepsia and Gastritis	45·4	34·4	20·1	100·0
Rheumatic Conditions : Non-Articular	33·7	32·7	33·6	100·0
(excl. Rheum. Fever) : Articular	39·0	27·6	33·4	100·0
Appendicitis	11·1	12·5	76·5	100·0
Influenza	18·7	63·2	18·1	100·0
Pneumonia	12·5	12·0	75·5	100·0
I.D.K.	17·5	14·9	67·7	100·0
Haemorrhoids	26·8	29·4	43·8	100·0
Infective Hepatitis	25·5	22·0	52·6	100·0
Synovitis and Arthritis	32·0	27·2	40·7	100·0
Boils and Carbuncles	39·0	39·8	21·2	100·0
Peptic Ulcer	47·6	37·4	15·0	100·0
Syphilis (incl. Toxic Jaundice)	83·5	1·8	14·7	100·0
Otitis Media	38·1	33·8	28·1	100·0
Scabies	79·4	13·0	7·6	100·0
T.B. Pulmonary	41·6	15·1	43·3	100·0
Other Sites	37·3	16·2	46·4	100·0
Sciatica	37·4	21·5	41·1	100·0
Malaria	47·5	22·7	29·8	100·0
Scarlet Fever	46·2	16·4	37·4	100·0
Nephritis	39·3	22·9	37·8	100·0
All Other Diseases	49·4	27·4	23·3	100·0
ALL DISEASES	**46·6**	**25·2**	**28·3**	**100·0**

SPECIALIST GROUPS	Relative Hospitalization Rates			
	I	II	III	Total
All Diseases of Skin (excl. Areolar Tissue)	64·3	23·1	12·7	100·0
All Diseases of E.N.T.	39·4	34·8	25·8	100·0
All Psychiatric Disorders	56·0	28·4	15·6	100·0
All Diseases of Genito-Urinary System	54·8	18·5	26·7	100·0
All Diseases of M.T.G.	55·8	31·3	12·9	100·0
All Diseases of Eye	63·7	17·0	19·3	100·0
All Other Diseases	42·5	24·3	33·2	100·0
ALL DISEASES	46·6	25·2	28·3	100·0
ALL ACCIDENTS	24·4	30·1	45·5	100·0
ALL BATTLE CASUALTIES	48·1	19·5	32·4	100·0
ALL CASES	43·4	25·8	30·8	100·0

I Treated exclusively in Military Hospitals

II Treated exclusively in E.M.S. Hospitals.

III All cases involving transfer to B.R.C.S. Auxiliary Hospitals or Convalescent Depots and transfer between Military and E.M.S. Hospitals.

TABLE 31 Diagnostic Distribution of Cases within each Type of Hospital; Military Personnel; 1943

INDIVIDUAL DISEASES	Relative Morbidity Rates			
	I	II	III	All Cases
Psychoneuroses	*4·6*	*5·4*	*2·6*	*4·2*
Psychoses	*1·3*	*0·7*	*0·3*	*0·9*
Other Psychiatric Disorders	*1·2*	*0·6*	*0·3*	*0·8*
All Psychiatric Disorders	7·1	6·6	3·2	5·9
Gonorrhoea	11·0	0·2	0·4	5·3
Tonsillitis	4·2	6·6	3·9	4·7
Hernia	0·5	0·6	13·2	4·1
Bronchitis	2·7	4·0	3·7	3·3
Impetigo	4·4	2·5	0·9	2·9
Varicose Veins	1·9	3·0	3·6	2·6
Common Cold	3·3	3·0	0·9	2·5
Dyspepsia and Gastritis	2·5	3·5	1·8	2·5
Rheumatic Conditions : Non-Articular	1·6	2·8	2·6	2·2
(excl. Rheum. Fever) : Articular	0·4	0·5	0·5	0·4
Appendicitis	0·5	1·0	5·4	2·0
Influenza	0·8	4·8	1·2	1·9
Pneumonia	0·5	0·9	4·9	1·8
I.D.K.	0·7	1·0	4·2	1·7
Haemorrhoids	0·9	1·8	2·5	1·6
Infective Hepatitis	0·8	1·2	2·7	1·4
Synovitis and Arthritis	1·0	1·5	2·0	1·4
Boils and Carbuncles	1·2	2·2	1·0	1·4
Peptic Ulcer	1·4	2·0	0·7	1·3
Syphilis (incl. Toxic Jaundice)	3·3	0·1	1·0	1·8
Otitis Media	1·0	1·6	1·2	1·2
Scabies	1·6	0·5	0·2	0·9
T.B.—Pulmonary	0·7	0·5	1·2	0·8
Other Sites	0·1	0·1	0·3	0·2
Sciatica	0·5	0·6	0·9	0·7
Malaria	0·4	0·3	0·4	0·4
Scarlet Fever	0·3	0·2	0·4	0·3
Nephritis	0·1	0·1	0·2	0·1
All Other Diseases	45·0	46·2	34·9	42·4
ALL DISEASES	100·0	100·0	100·0	100·0

SPECIALIST GROUPS	Relative Casualty Rates			
	I	II	III	All Cases
All Diseases of Skin (excl. Areolar Tissue)	13·6	8·2	3·8	9·2
All Diseases of E.N.T.	7·4	11·0	6·8	8·2
All Psychiatric Disorders	6·4	5·5	2·5	5·0
All Diseases of Genito-Urinary System	5·3	3·0	3·7	4·2
All Diseases of M.T.G.	2·0	1·9	0·6	1·5
All Diseases of Eye	2·0	0·9	0·9	1·4
All Other Diseases	54·0	51·9	59·4	55·1
ALL DISEASES	90·7	82·4	77·6	84·5
ALL ACCIDENTS	8·1	16·8	21·3	14·4
ALL BATTLE CASUALTIES	1·2	0·8	1·1	1·1
ALL CASES	100·0	100·0	100·0	100·0

I Treated exclusively in Military Hospitals.

II Treated exclusively in E.M.S. Hospitals

III All cases involving transfer to B.R.C.S. Auxiliary Hospitals or Convalescent Depots and transfer between Military and E.M.S. Hospitals.

§2 SEASONAL DISTRIBUTIONS OF HOSPITAL ADMISSIONS IN THE U.K., 1943

THE source of data in this section is A.Fs. I1220 with reference to other ranks only. Thus the figures do not refer to cases treated in medical units other than hospitals documented as such. Partly because the figures are on this account defective, partly because of the known leakage due to faulty rendering of A.F. I1220 by E.M.S. hospitals, it would be misleading to present absolute rates. These would in any case blur the picture, in so far as the main objective is to bring into focus relative liability of different diseases to gross seasonal fluctuation and the seasons at which incidence is greatest or least. With that end in view we are entitled to treat the records as a representative sample; and to exhibit the data as relative monthly incidence distributions on the same scale. Tables 32-33 for military other ranks and A.T.S. exhibit the size of each sample in the extreme left-hand column. The scatter index (σ) shown in the extreme right-hand column indicates which diseases are more or less liable to large seasonal fluctuations. As we should expect, all the diseases with a high value of σ, *i.e.* subject to great seasonal variation (Chart 9) are of the communicable class, notably: (*a*) RUBELLA, MEASLES, MUMPS, with peaks in late winter or spring and lowest incidence in autumn; (*b*) BACILLARY DYSENTERY and TYPHOID, with peaks in late summer or autumn and lowest incidence at mid-winter. Two non-communicable diseases exhibited noteworthy seasonal fluctuation—though of an order far less than that of the above-mentioned. ASTHMA had an autumn peak with lowest incidence in spring, and MANIC DEPRESSIVE PSYCHOSIS had a summer peak with lowest incidence in winter. ANXIETY STATE also showed a tendency to rise in summer and fall in winter, but this may be due to the inclusion of some Depressives in this diagnosis.

It should scarcely be necessary to emphasize that these distributions are not comparable with those of a civilian population in which there is domiciliary treatment of communicable diseases, greater variability with respect to the scope of preventive measures and a large component of pre-service age groups. Hence it should occasion no surprise if communicable diseases (*e.g. diphtheria*) subject to large epidemic fluctuations in the one maintain throughout the calendar year a fairly steady level in the other. Of communicable diseases other than the five cited previously, it is noteworthy (Chart 10) that the spring peak for SCARLET FEVER is appreciably later than that of RHEUMATIC FEVER, and that *acute* OTITIS MEDIA had its maximum incidence at mid-winter. The chronic form was subject to much less seasonal variation, but the incidence of *chronic* SINUSITIS with a peak in late winter fluctuated somewhat more than that of the acute stage. It is not surprising that SYPHILIS comes at the foot of the list of communicable diseases arranged in descending order of seasonal variability. The fact that GONORRHOEA has a much higher scatter index is of no significance in this connexion, since its relative incidence declines steadily month by month, a fact attributable to temporary change of policy with reference to extent of treatment of this disease in hospital.

TABLE 32 **Seasonal Distributions 1943; Military Other Ranks**

	Cases	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Scatter Index
(a) **Communicable Diseases**															
Rubella	1,017	2·2	4·1	11·9	24·3	27·1	17·9	5·9	2·3	0·9	0·9	0·7	1·7	100·0	9·2
Measles	953	8·3	13·5	21·0	26·5	14·8	7·3	4·6	1·1	0·8	0·6	0·9	0·6	100·0	8·5
Mumps	984	16·0	18·4	18·3	12·5	8·9	5·6	4·6	2·9	3·5	2·4	3·8	3·1	100·0	6·0
Bacillary Dysentery	608	4·0	7·3	7·6	3·8	6·1	9·1	13·1	25·4	12·4	6·0	3·2	2·0	100·0	6·0
Typhoid	162	1·1	4·5	2·4	1·8	2·4	16·2	8·4	10·2	13·9	15·4	15·2	8·4	100·0	5·6
Bronchopneumonia	823	10·7	13·2	12·5	10·2	7·2	5·3	3·5	3·4	4·4	4·8	11·5	13·3	100·0	3·8
Lobar pneumonia	1,819	13·0	10·0	14·0	10·6	8·4	5·0	4·3	3·7	3·2	6·5	10·0	11·3	100·0	3·6
Otitis Media—*acute*	731	12·4	12·7	8·6	9·9	5·7	4·9	4·2	5·6	6·0	5·8	10·4	14·0	100·0	3·3
Erysipelas	264	10·6	6·0	9·1	6·9	8·5	6·2	6·4	6·0	6·3	8·4	18·1	7·5	100·0	3·1
Scarlet Fever	842	7·6	10·8	11·3	11·9	10·7	7·0	3·8	3·8	5·4	6·1	9·9	11·6	100·0	2·9
Chickenpox	411	13·1	9·5	4·7	9·6	10·8	7·0	8·0	6·0	5·8	7·2	9·6	8·7	100·0	2·3
Rheumatic Fever	461	9·9	11·0	11·9	10·3	8·3	6·4	6·4	5·6	5·4	5·5	10·8	8·4	100·0	2·3
Sinusitis—*chronic*	250	8·9	10·6	13·1	7·7	5·5	7·4	8·7	5·5	8·7	8·5	9·6	5·9	100·0	2·2
T.B. other than pulmonary	435	6·0	7·7	9·5	11·1	12·2	7·0	8·9	6·8	8·6	6·0	10·5	5·7	100·0	2·1
Gonorrhoea	10,675	12·3	11·7	9·9	7·9	7·2	7·8	8·0	8·8	7·7	7·6	6·5	4·7	100·0	2·0
Sinusitis—*acute*	135	8·9	10·1	11·5	8·9	8·0	4·5	5·2	8·0	6·9	9·7	9·3	8·8	100·0	1·9
Glandular Fever	272	5·1	8·1	9·5	11·4	9·4	11·2	8·0	7·6	8·8	6·7	7·2	6·9	100·0	1·7
Otitis Media—*chronic*	1,646	9·2	8·4	7·4	9·4	6·9	6·8	8·0	9·8	8·4	7·1	11·4	7·3	100·0	1·4
Diphtheria	779	7·9	8·7	9·9	9·2	7·7	9·6	6·7	8·1	6·5	6·7	9·2	9·8	100·0	1·2
Impetigo	7,732	8·2	9·1	9·2	8·3	7·9	7·7	6·3	8·5	8·6	9·7	10·3	6·3	100·0	1·2
T.B. Pulmonary	1,353	8·1	9·4	7·0	7·3	8·6	9·6	7·4	10·1	8·1	7·0	9·6	7·9	100·0	1·1
Infective Hepatitis	3,536	9·3	10·2	8·7	9·0	8·4	7·1	6·1	7·4	7·1	8·2	8·8	9·6	100·0	1·1
Tonsillitis	3,604	8·4	7·4	7·9	7·5	7·7	6·8	8·0	7·8	10·0	9·8	9·9	8·9	100·0	1·1
Syphilis	2,471	9·1	9·3	8·9	7·9	7·6	7·9	8·2	8·3	7·6	9·1	8·0	8·1	100·0	0·6
(b) **Non-Communicable Diseases**															
Asthma	925	7·5	5·3	6·2	5·3	5·9	8·2	7·7	8·4	12·4	10·2	14·1	8·6	100·0	2·5
Manic Depressive psychosis	1,004	8·3	8·0	6·5	9·0	7·9	10·7	12·4	10·3	8·6	7·6	6·3	4·4	100·0	2·1
Bronchitis—*chronic*	3,190	10·0	8·1	9·6	7·1	7·6	6·8	7·4	6·7	7·5	7·7	11·8	9·6	100·0	1·4
Gastric Ulcer	624	7·3	9·3	8·8	7·2	7·9	7·8	9·3	7·0	5·3	9·2	11·3	9·5	100·0	1·4
Anxiety State	6,458	6·6	7·8	8·2	8·1	8·7	9·6	10·1	9·1	8·8	7·4	9·1	6·4	100·0	1·0
Hysteria	2,908	6·7	8·2	8·0	7·0	7·9	7·8	8·5	8·3	9·3	10·3	10·3	7·6	100·0	1·0
Duodenal Ulcer	2,439	8·9	8·3	9·8	8·3	8·8	8·4	7·7	7·9	7·5	8·3	9·0	7·2	100·0	0·8
Sciatica	1,462	9·6	9·3	8·9	7·5	9·3	8·1	8·1	7·4	7·9	7·5	8·6	7·7	100·0	0·6

TABLE 33

Seasonal Distributions 1943 ; A.T.S. Other Ranks

	Cases	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Scatter Index
(a) **Communicable Diseases**															
Bacillary Dysentery	111	4·0	—	0·9	26·6	4·5	8·2	8·6	24·0	16·9	1·7	4·5	—	100·0	8·8
Rubella	264	3·2	3·5	14·3	29·6	20·6	11·5	7·8	1·8	—	1·1	3·7	2·9	100·0	8·7
Measles	304	13·9	15·5	22·5	19·9	16·7	5·3	2·1	2·4	1·5	—	—	0·3	100·0	8·3
Mumps	208	18·4	19·4	16·7	10·1	9·0	8·2	1·7	2·2	4·5	2·6	3·2	4·0	100·0	6·3
Otitis Media—*acute*	113	16·0	8·2	9·9	7·3	3·4	2·6	4·1	3·3	6·8	4·1	11·3	22·9	100·0	5·8
Lobar Pneumonia	104	14·2	12·2	11·7	7·8	2·8	2·8	1·8	3·5	5·5	6·3	15·9	15·5	100·0	5·1
Scarlet Fever	275	11·2	12·6	8·9	8·2	9·9	4·6	4·1	6·0	2·4	8·2	11·7	12·2	100·0	3·3
Diphtheria	191	5·0	16·3	9·6	11·8	8·6	7·2	7·3	8·7	8·5	6·4	4·6	6·0	100·0	3·1
Gonorrhoea	390	9·6	9·2	11·8	11·4	12·5	9·6	7·4	8·3	7·2	3·4	6·3	3·5	100·0	2·9
T.B. other than pulmonary	94	9·1	6·2	12·0	12·1	7·3	8·4	11·0	4·0	7·2	7·0	8·4	7·2	100·0	2·3
Tonsillitis	534	5·3	8·6	8·5	8·8	8·5	6·5	7·1	8·6	9·5	11·0	11·4	6·4	100·0	1·8
Infective Hepatitis	302	6·0	9·7	11·9	8·6	9·1	6·2	6·5	9·0	8·0	9·4	7·5	8·0	100·0	1·6
Impetigo	329	8·9	5·7	8·5	9·5	11·1	8·4	8·0	8·3	8·6	7·2	10·0	5·9	100·0	1·5
T.B. Pulmonary	161	9·4	8·0	8·3	7·1	9·1	8·0	11·7	7·0	7·2	7·7	7·4	9·0	100·0	1·2
(b) **Non-Communicable Diseases**															
Asthma	206	7·3	8·6	8·6	3·5	4·3	5·8	6·9	11·4	15·6	9·3	12·1	6·6	100·0	3·3
Bronchitis—*chronic*	111	15·3	9·4	9·2	10·2	6·1	7·0	5·0	6·7	6·9	5·1	11·5	7·8	100·0	2·9
Manic Depressive Psychosis	177	4·3	6·7	8·8	8·3	7·3	7·3	10·7	11·7	11·1	10·3	7·4	6·1	100·0	2·2
Anxiety State	432	6·0	8·7	8·4	7·2	7·7	10·4	12·0	10·0	10·4	7·3	6·5	5·4	100·0	1·9
Hysteria	444	9·9	8·9	6·0	7·9	9·7	8·0	7·4	8·4	10·5	6·6	9·4	7·2	100·0	1·3

so far as available documentary material permits, what follows is intended to supplement § 1 above with information concerning cases not serious enough for hospital treatment, and therefore dealt with entirely in reception stations or camp reception stations. It does not include cases of diseases dealt with exclusively in medical inspection rooms. We have no satisfactory information regarding wastage at this level of military personnel.

The return submitted by reception stations (A.F. A2023) in the triennium 1943-5, shows only total numbers treated. It contained no information w.r.t. diagnosis. During 1942, this deficiency, now remedied, did not exist. All reception stations and camp reception stations in the United Kingdom rendered a more detailed return recording the following information: (i) Regimental detail; (ii) Diagnosis; (iii) Length of Stay; (iv) Disposal on Discharge. The detailed returns covering six months (June-November 1942 inclusive) were available for the ensuing survey. When examining the contents of the following tables we have to remember that the diagnostic distribution of cases treated in reception stations is by no means constant over long periods. To appreciate the force of this contention it suffices to cite *Gonorrhoea* and *Scabies* w.r.t. which regulations regarding treatment in hospital, in reception station or in medical inspection room have changed drastically during the past five years. Such changes are inevitable, because the gravity of a disease depends on the methods available for dealing with it; and a noteworthy therapeutic advance may demote a disease to a lower level in the hierarchy of wastage and risk. So it is not legitimate to regard a six-monthly survey as truly representative of reception station cases throughout the war. What it does provide is a picture of low-grade domiciliary morbidity in the United Kingdom, as it was in 1942. With due regard to the qualifications stated w.r.t. changing circumstances it also furnishes a general indication of the type and relative frequency of cases likely to be treated in reception stations; and as such should be read in conjunction with the more detailed analysis of hospital cases elsewhere. Since the total number of cases dealt with during the six months was over 150,000 it was necessary to adopt a sampling procedure. For A.T.S. the analysis covers all cases treated during the middle week of each month. Military figures also refer to the middle week of each month but only to a sample of 1 in 10. Because we are here concerned solely with low-grade morbidity, figures cited in Tables 34-38 *exclude all cases subsequently transferred to hospital.* The residual sample consists, of approximately 3,000 military cases and 7,000 A.T.S., a sufficiently large number to make the standard error w.r.t. sampling small in relation to any rates cited below. The period available is not ideal for assessment of seasonal fluctuation, since it includes more summer than winter months, and excludes spring. This is unavoidable because records to hand cover only the six months June-November inclusive. Consequently, the contribution of predominantly winter conditions is somewhat underweighted. Indices used are essentially as for analysis of hospital data elsewhere (Part II § 1); *viz.*: *Relative Morbidity Rates* (R.M.R.) measuring relative frequency of admission to reception stations and *Relative Wastage Rates* (R.W.R.) measuring the proportionate contribution each type of casualty makes to total man-day wastage in reception stations. *Absolute Morbidity Rates* and *Mean Duration of Stay* (M.D.S.) in days also appear in the tables. Comparison of male and female rates is unfortunately restricted by lack of information w.r.t. age in the reception station returns. It is therefore impossible to compute age-incidence distributions and age-standardization factors. All we can do is to compare (i) *crude relative* rates as a measure of the *proportionate contribution* of any particular disease to all cases treated in reception stations for males and females respectively; (ii) *crude absolute* rates to indicate whether a particular disease actually leads to more reception station admissions among males or among females. We cannot decide how far such differences are due to innate biological differences, to administrative circumstances or to differences w.r.t. age composition of the military and A.T.S. populations at risk.

Morbidity and Wastage: Military Other Ranks

The data at our disposal for what follows are not susceptible to such refinement of diagnostic specification as are those derived from A.F. I1220 which supplied the raw materials of § 1 above. Accordingly, we are forced to include certain broad categories in Tables 34-36. Within such limits there is little difficulty in accommodating diagnostic data which are often crude and sometimes open to alternative interpretations, *e.g.*, what is the proper pigeon hole for the auxiliary stigmatized as *rash.* Table 38 shows a breakdown of the main groups, to indicate what individual diagnoses are mainly contributory to each. Figures in Table 34 make it clear that the great majority of reception station admissions w.r.t. military other ranks are attributable to a small number of individual diseases and groups of diseases. Thus SKIN conditions (here *incl.* Inflammation of the Areolar Tissue) make up more than 20% of all admissions w.r.t. disease. SCABIES adds a further 16%. TONSILLITIS and related conditions account for over 11%, as do GASTRIC AND INTESTINAL disorders. COMMON COLD makes up 10%. These five items together account for *over two-thirds* of all sick cases admitted. Common Cold shows the greatest seasonal fluctuation. Since it rises during the winter months, its contribution over a whole year would presumably be somewhat higher than the rate cited. On the other hand, treatment of *Scabies* in medical inspection rooms was introduced more generally about the end of 1942. Hence the proportion of Scabies cases admitted to reception stations in the United Kingdom in subsequent years would be smaller than figures here suggest. In 1942 *gonorrhoea* was not treated in reception stations or camp reception stations. It is noteworthy that INJURIES make up less than one-tenth of all cases. Only 1 in 50 of them was a *burn.* It is also worthy of note that the contribution of SINUSITIS (diagnosed as such) and of INFLUENZA (ditto) were both negligible at the reception station level.

According to regulations no case should be retained in a reception station for more than 10 days. So variation w.r.t. length of stay in reception stations is much less than for hospital cases. Consequently, the contributions of the various items to total *Man-day Wastage* do not differ very substantially from their contributions to total *Morbidity.* Indeed, the big five cited above are by far the most important from the point of view of wastage as of morbidity, though not in exactly the same order. Owing to relatively long stay (7 *days*), SKIN conditions make up no less than *a quarter* of all man-days spent in reception stations. On the other hand, the contribution of SCABIES falls to 10%. Between them the five main conditions account for 67% of man-day wastage on account of diseases among military other ranks in reception stations. Figures cited above and elsewhere for Mean Duration of Stay include both day of admission and of discharge because both these days are effectively lost to duty. To view reception station morbidity and wastage in a correct perspective, *vis a vis* corresponding hospital and convalescent depot figures, it is necessary to bear in mind a basic difference. Whereas *admissions* to reception stations were approximately two-thirds of the corresponding figure for hospitals during the same period, *man-day wastage* in reception stations was only about *one-tenth* as great as for hospital and convalescent depot. In 1942 each soldier spent in reception stations an average of approximately 0·3% of his time or 1 day as compared with 11 days in hospital and convalescent depot.

Disease accounted for nine-tenths of all days spent in reception stations and injuries for one-tenth.

Morbidity and Wastage: A.T.S. Other Ranks

Among A.T.S. as among military, SKIN conditions, SCABIES, TONSILLITIS and related disorders, GASTRIC AND INTESTINAL complaints and COMMON COLD made up two-thirds of all sick cases admitted to reception stations; but the order of these items in the hierarchy of A.T.S. morbidity is not the same (Table 35). For women, SCABIES and COMMON COLD come first. Each accounts for 15% of all admissions w.r.t. disease; and inclusion of later winter months would increase this contribution, particularly w.r.t. Common Cold. SKIN conditions and TONSILLITIS and allied conditions follow, each with 12½% and the GASTRO-INTESTINAL disorders make up 10%. With due allowance for time spent in reception stations as well as for frequency of admission, SKIN conditions and TONSILLITIS replace Scabies and Common Cold at the head of the man-day wastage list. *Absolute* admission rates to reception stations are twice as high as A.T.S. hospital admissions and 2½ times as high as military admissions to reception stations. Wastage in reception stations is about 2½ days for each individual a year, which is *two-fifths* of the corresponding figure for hospital and convalescent depot. One might suspect that an absolute admission rate so much higher among A.T.S. than among males is attributable, at least to a substantial extent, to minor feminine disorders. This is not so. Disorders of the GENITAL TRACT and of the MENSTRUAL CYCLE together make up *less than* 3% of all A.T.S. cases. Even if we add such vague diagnoses included under *Other Diseases* as might presumptively be associated with the reproductive system, this figure would not be materially increased. INJURIES account for little more than 1 in 20 of all cases.

Sex Differentials

Previous comment has already made it clear that we must confine sex comparison to crude rates in the absence of relevant data for compilation of age-standardizing factors. As regards our five main items, comparison of relative rates to ascertain how *relative* contributions of individual diseases to total morbidity (Table 36) differ, shows that the R.M.R. for COMMON COLD is appreciably higher among A.T.S. than among military while the rate for SKIN conditions is lower, more particularly w.r.t. Impetigo, a result which tallies closely with hospital experience. Among A.T.S., BRONCHITIS and GINGIVITIS too have lower crude R.M.Rs. than among men. Those for CYSTITIS and PYELITIS are very much higher. It is noteworthy that *burns* not only make up a higher proportion of all injuries among women than among men (Table 38) but also have a higher absolute admission rate. *Mean Duration of Stay* in reception stations w.r.t. military and A.T.S. tallies remarkably closely for each disease cited. The most striking fact w.r.t. *absolute* rates has been the subject of earlier comment, *viz.* A.T.S. admissions for all causes are 2½ times as high as for men. Every individual disease or group sufficiently large to cite in Tables 34-36 has an admission rate absolutely higher among females than among males. The extent of the excess varies considerably; but even w.r.t. Skin conditions and Bronchitis, for which R.M.Rs. of A.T.S. were relatively low, the A.T.S. are over one and a half times as high as the military *absolute* rates. There is indeed little doubt that administrative considerations account largely for the A.T.S. excess. That is to say, different criteria of admissibility apply to men and women. For example, treatment of Scabies in units without admission to reception station was introduced for soldiers earlier and more extensively than for A.T.S. Partly because of this different threshold of admission and partly through lack of data for age-standardization, it would be illegitimate to draw general conclusions of a biological nature from figures cited. Nevertheless, our information does answer such *administrative* questions as: (*a*) *what are the main causes of admission to reception stations*? (*b*) *what is the relative importance of one or other such cause among males and females respectively*?

Summary

Previous analyses of medical wastage with respect to mortality, discharge from the service and hospitalization have emphasized that a very small group of diseases characteristic of each category account for a very large proportion of wastage arising therefrom. This section brings into focus what a very small group of disorders (Chart 11) contribute to wastage in medical units *below* hospital level. Analysis of cases treated in reception stations in the United Kingdom during the second half of 1942 leads to the following conclusions:

(*a*) The five largest categories of admission w.r.t. disease are SKIN conditions, SCABIES, TONSILLITIS and related disorders, GASTRO-INTESTINAL complaints and COMMON COLD. These five account for *two-thirds* of all sick cases treated both among military and among A.T.S. ACCIDENTAL INJURIES make up 10% of *all* admissions among males and 5% among females.

(*b*) *Absolute* admission rates w.r.t. A.T.S. are 2½ times as high as among military. Disorders of the Reproductive System do NOT appreciably contribute to this disparity which is in all probability largely attributable to administrative procedure.

(*c*) Military man-day wastage in reception stations averages approximately 1 *day for each soldier a year*. This is only one-tenth of wastage in hospital and convalescent depot. Each member of the A.T.S. spends an average of 2½ *days a year* in reception stations, which is two-fifths of the corresponding figure for hospital and convalescent depot.

(*d*) Wastage in *all* medical units in the United Kingdom on account of disease and accidental injury was thus 12 days for each soldier a year and 8 days for each member of the A.T.S. a year.

TABLE 34 **Morbidity, Man-day Wastage and Duration of Stay of Reception Station Cases in the U.K.; Military Other Ranks ; Second Half of 1942**

(a) DISEASES	R.M.R.	R.W.R.	M.D.S. (*days*)	Equivalent Annual* Rate per 1,000 Strength
Skin Conditions (*incl.* I.A.T.)	20·9	25·4	7·1	30·3
Scabies	16·0	10·7	4·0	23·2
Tonsillitis and Related Conditions	11·5	12·0	6·1	16·6
Gastro-Intestinal Disorders	11·2	10·3	5·4	16·5
Common Cold	9·7	8·5	5·1	14·1
Rheumatoid and Other Articular or Neuro-muscular Conditions	5·2	6·0	6·8	7·6
Bronchitis	4·5	5·0	6·5	6·6
Effects of Inoculation	2·8	2·3	4·8	4·0
Gingivitis and Vincent's Angina	1·9	2·6	8·1	2·8
Pediculosis	0·6	0·3	2·5	0·9
Otitis Media and Externa	0·6	0·6	5·8	0·8
Influenza	0·5	0·5	5·9	0·7
Cystitis and Pyelitis	0·3	0·4	7·7	0·5
Other Diseases	14·3	15·4	6·4	20·2
ALL DISEASES	100·0	100·0	5·9	144·8
(b) ALL CASES				
ALL DISEASES	90·8	90·5	5·9	144·8
ALL INJURIES	9·2	9·5	6·1	14·5
ALL CASES	100·0	100·0	5·9	159·4
Sample Size	3,257 Cases	19,227 Days		

TABLE 35 **Morbidity, Man-day Wastage and Duration of Stay of Reception Station Cases in the U.K. A.T.S. Other Ranks ; Second Half of 1942**

(a) DISEASES	R.M.R.	R.W.R.	M.D.S. (*days*)	Equivalent Annual* Rate per 1,000 Strength
Scabies	15·6	11·1	3·9	59·9
Common Cold	14·6	13·3	5·0	54·3
Skin Conditions (*incl.* I.A.T.)	12·7	15·4	6·7	48·6
Tonsillitis and Related Conditions	12·4	14·2	6·3	47·3
Gastro-Intestinal Disorders	9·9	8·9	5·0	37·9
Effects of Inoculation	3·4	2·8	4·5	13·3
Rheumatoid and Other Articular or Neuro-muscular Conditions	3·1	4·0	7·1	12·0
Bronchitis	2·9	3·7	7·0	10·8
Disorders of the Menstrual Cycle	1·8	1·6	5·0	6·8
Conditions of the Genital Tract	1·1	1·6	8·0	4·2
Cystitis and Pyelitis	1·3	1·6	7·2	4·8
Pediculosis	1·0	0·5	3·0	3·8
Gingivitis and Vincent's Angina	0·9	1·1	7·4	3·3
Other Diseases	19·3	20·2	5·7	75·8
ALL DISEASES	100·0	100·0	5·5	382·8
(b) ALL CASES				
ALL DISEASES	94·7	94·3	5·5	382·8
ALL INJURIES	5·3	5·7	5·9	21·7
ALL CASES	100·0	100·0	5·5	404·5
Sample Size	7,179 Cases	39,714 Days		

*These estimates, as explained in the text, are subject to some error arising from the seasonal asymmetry of the sample.

TABLE 36

Sex-Differentials w.r.t. Low-Grade Morbidity; Reception Station Cases in the U.K.; Second Half of 1942

(a) DISEASES	Sex-Differentials A.T.S. : Military		
	Crude Relative Morbidity Rate	Crude Absolute Morbidity Rate	M.D.S.
Skin Conditions (*incl.* I.A.T.)	0·6	1·6	0·9
Scabies	1·0	2·6	1·0
Tonsillitis and Related Conditions	1·1	2·8	1·0
Gastro-Intestinal Disorders	0·9	2·3	0·9
Common Cold	1·5	3·9	1·0
Rheumatoid and other Articular or Neuro-muscular Conditions	0·6	1·6	1·0
Bronchitis	0·6	1·6	1·1
Effects of Inoculation	1·2	3·3	0·9
Gingivitis and Vincent's Angina	0·5	1·2	0·9
Pediculosis	1·7	4·4	1·2
Cystitis and Pyelitis	4·3	10·0	0·9
Other Diseases	1·4	4·0	0·9
ALL DISEASES	1·0	2·6	0·9
(b) ALL CASES			
ALL DISEASES	1·0	2·6	0·9
ALL INJURIES	0·6	1·5	1·0
ALL CASES	1·0	2·5	0·9

TABLE 37

Seasonal Variations w.r.t. Certain Diseases Treated in Reception Stations in the U.K.; Second Half of 1942; M.M.Rs. per 1,000 Strength

	June	July	Aug.	Sept.	Oct.	Nov.
(a) MILITARY						
Skin Conditions (*incl.* I.A.T.)	2·2	2·3	2·1	2·9	3·1	2·5
Scabies	1·6	2·4	1·9	2·0	2·6	1·1
Tonsillitis and Related Conditions	1·2	1·3	1·4	1·5	1·7	1·2
Gastro-Intestinal Disorders....	0·7	1·0	1·7	1·7	1·5	1·8
Common Cold	0·9	0·5	0·9	1·1	1·4	2·3
Rheumatoid and Other Articular or Neuro-muscular Conditions	0·6	0·6	0·5	0·7	0·7	0·7
Bronchitis	0·4	0·5	0·3	0·6	0·7	0·9
(b) A.T.S.						
Skin Conditions (*incl.* I.A.T.)	4·1	4·4	4·0	4·2	4·1	3·5
Scabies	4·9	5·7	4·5	5·4	6·0	3·4
Tonsillitis and Related Conditions	4·3	3·2	3·5	4·2	4·0	4·5
Gastro-Intestinal Disorders....	3·2	3·2	3·2	3·5	2·9	3·1
Common Cold	3·2	2·8	3·8	4·4	6·2	6·9
Rheumatoid and Other Articular or Neuro-muscular Conditions	0·8	1·1	1·0	1·1	0·8	1·1
Bronchitis	0·5	0·5	0·6	1·0	1·4	1·5

TABLE 38

Detailed Breakdown of Disease Groups Shown in Tables 34-36; Reception Station Cases in the U.K.; Second Half of 1942

	Military	A.T.S.
Skin Conditions (incl. I.A.T.)	(*618*)	(*860*)
Impetigo	22·0	13·1
Septic Conditions	15·9	21·7
Boils	14·9	19·3
I.A.T.	13·4	11·8
Dermatitis	10·7	14·7
Abscess	7·0	4·8
Epidermophytosis	5·7	1·6
Others	10·5	13·0
Total	100·0	100·0
Tonsillitis and Related Conditions....	(*340*)	(*843*)
Tonsillitis	78·5	64·6
Pharyngitis	10·0	14·0
Laryngitis	5·6	14·3
Quinsy	2·3	0·6
Others	3·5	6·4
Total	100·0	100·0
Gastro-Intestinal Disorders	(*332*)	(*672*)
Gastritis	32·5	29·2
Diarrhoea	30·7	24·4
Enteritis	14·4	10·9
Gastro-Enteritis	10·8	10·9
Dyspepsia	6·0	8·5
Others	5·4	16·2
Total	100·0	100·0
Rheumatoid and Other Articular or Neuro-muscular Conditions	(*155*)	(*213*)
Synovitis	27·1	14·0
Fibrositis	21·3	24·9
" Rheumatism "	20·0	34·7
Lumbago	18·7	16·0
Arthritis	5·8	2·8
Myalgia	3·9	2·8
Others	3·2	4·7
Total	100·0	100·0

	Military	A.T.S.
Injuries	(*299*)	(*384*)
Sprains and Strains	25·4	33·0
Contusions	14·7	9·6
Lacerations	10·7	6·5
Abrasions	7·0	4·4
Fractures	5·7	3·1
Concussion	3·0	6·0
Burns and Scalds	2·0	11·4
Others	31·4	25·8
Total	100·0	100·0
Disorders of the Menstrual Cycle		(*120*)
Dysmenorrhoea		47·5
Menorrhagia		38·3
Amenorrhoea		13·3
Epimenorrhoea		0·8
Total		100·0
Conditions of the Genital Tract		(*74*)
" Pregnancy "		40·5
Leucorrhoea		35·1
Salpingitis		4·0
Others		20·2
Total		100·0

§4 LOW-GRADE MORBIDITY IN A.T.S. WITH SPECIAL REFERENCE TO TRADE

THE original aim of what follows was to estimate sickness rates in different employment groups of the A.T.S., with special reference to signal trades and cooks and orderlies employed with signal units. Though the results of the survey have not justified the anticipations which prompted its undertaking, some general information obtained in the course of it is worth putting on record in view of the paucity of documentary material w.r.t. low grade morbidity in the Army or A.T.S. Two London medical inspection rooms catering for 11 different units were selected for the purpose. During two 28 day periods in 1945, *viz.*, July 1-28 and July 15-August 11, every girl attending for medical attention was recorded with respect to diagnosis, treatment and information bearing on the following: employment, age, living quarters, whether working above or below ground and whether married or single. The data were incorporated on coding slips for subsequent sorting. The total strength of all units concerned was 3,206; and the total number of attendances at the two M.I. Rooms was 889. The units included in the enquiry were as follows:

No. 1 War Office Signals No. 1 Coy.	No. 1 London District Group D. Coy.
No. 1 War Office Signals No. 2 Coy.	No. 5 London District Group K and L Coys.
No. 1 War Office Signals No. 3 Coy.	No. 5 London District Group M. Coy.
No. 1 London District Signals No. 1 Coy.	No. 9 London District Group A and B Coys.
No. 1 London District Group C Coy.	A.T.S. Provost Wing.
	920 War Office M.T. Coy.

Employment groups included in these units are as follows:

I. *Signal Trades*
- (i) Switchboard operator (S.B.O.).
- (ii) Teleprinter operator (T.P.O.).
- (iii) Operator Wireless and Line (O.W.L.)
- (iv) Operator Keyboard and Line (O.K.L.).
- (v) Operator Wireless, Keyboard and Switch (O.W.K.S.).
- (vi) Cipher High Grade.
- (vii) Cipher Medium Grade.

II. *Non-signal trades*
- (*a*) General duty orderlies
- (*b*) Cooks and cooks' assistants.
- (*c*) Clerks (excluding pay clerks).
- (*d*) Pay clerks—machine operators.
- (*e*) Pay clerks—others.
- (*f*) Drivers.

Sickness Rates

Table 39 shows sickness rates based on attendances per 100 strength during the 28-day periods in the different employment categories, subdivided thus:

(*A*) denotes that the girl *returned to full duty*;

(*B*) includes those given light work, those put off duty but allowed to remain in their billets and those admitted to reception station or hospital.

In so far as we are concerned with morbidity among signal units, the relevant data are as follows:

	Total Sick.	*Group B.*
Signals	23·4	6·0
Others	29·8	6·0
Difference	6·4	0·0

These figures show that total sickness rate of signal personnel is significantly lower than that of non-signal personnel, the difference (6·4) being 4 times its standard error (1·6); but among those who were sufficiently sick to justify interference with normal duty there was no difference between the two groups. As shown later, rates for married are significantly higher than rates for single girls, and it is therefore noteworthy that 20·1% of non-signal personnel reporting sick were married as against only 10·9% of sick in signal units. If we assume that the proportion of married women who go sick is not affected by employment, it would thus appear that there were fewer married women in the signal group. Had the proportion of married women been equivalent to that of other units, the signal sickness rate would presumably have been higher (*vide infra*). It has been suggested that Cipher clerks have the most trying job assigned to signal personnel. Their sick rate therefore calls for separate comment. The relevant figures are as below:

	Total Sick	*Group B*
Cipher Clerks	29·6	6·0
Other Signal Personnel	21·9	6·0

Among personnel not in signal units, G.D.Os. (Table 39) have a higher *total* rate than any other employment group, but in Group B cooks have the highest rate. It has been suggested that cooks and orderlies employed with signal units have a higher sickness rate due to longer hours necessitated by day and night shifts. Table 40 shows a breakdown with respect to these two groups. During the period under consideration there was thus a significantly higher rate among signal G.D.Os., and cooks, both with respect to total sickness and to sickness involving removal from full duty. Below are sickness rates of clerks employed on general duties in the War Office and other offices, contrasted with those of clerks employed in pay offices.

	Total Sick	*Group B*
Clerks	18·9	2·2
Pay Clerks	25·6	5·1
Difference	6·7±2·6	2·9±1·2

Among the above, the percentages reporting sick with a diagnosis of anxiety or other psychiatric disorder and general debility were:

Clerks	2·6
Pay Clerks	6·3
Difference	3·7±1·3

Diagnostic Data

Cases were sorted with respect to the following groups for which Table 41 gives the breakdown:

1. Upper respiratory infections. 2. Anxiety state, general debility, etc. 3. Skin diseases and infections of areolar tissue. 4. Gynaecological disorders and pregnancy. 5. Alimentary disorders. 6. Injuries and accidents. 7. All others.

Outstanding features exhibited in Table 41 are:

(*a*) High rates with respect to anxiety, other psychiatric conditions and general debility, in certain signal trades (T.P.O. and O.W.L., and O.K.L.) and among clerks (non-machine) in pay offices.

(*b*) The big contribution which skin diseases and infections of areolar tissue make to the high sickness rate in cooks and orderlies.

(*c*) A high rate of alimentary disturbance (chiefly *gastric* disorder) among drivers.

(*d*) A high *injury* rate (including burns) among cooks and drivers.

Table 42 shows a further breakdown with respect to the extent of interference with normal duty. For this purpose, it shows a three-fold split of Group B: (1) Light work; (2) Off duty but allowed to stay in billets; (3) Admitted to C.R.S. or hospital. The salient features of Table 42 are:

(*a*) of those put on *light* duty 50 % are due to psychiatric disorders, skin diseases and injuries;

(*b*) of those put *off* duty nearly one half are due to upper respiratory infections and psychiatric disorders;

(*c*) of those admitted to reception stations and hospitals, one-third are assignable to upper respiratory infection and one-third to skin disease, I.A.T. and various functional disorders.

Table 43 exhibits the same data in a different way. Upper respiratory infections among diagnostic categories specified give rise to the greatest loss of working time, 26% of all these cases being put off duty or on to light duty and over 10% being admitted to the reception station.

Differences Between Married and Single Auxiliaries

For the sample as a whole it is possible to relate sickness figures to the overall relative strengths of married and single auxiliaries :

	Total Sick	*Group B*
Married	50·8	11·9
Single	25·2	5·4
Difference	25·6±2·9	6·5±1·9

From this it appears that married women go sick significantly more often than single women and more frequently go off duty. A comparison of diagnosis categories for the two groups discloses a wide disparity between numbers in each group reporting for gynaecological conditions (including pregnancy). If we exclude such conditions from both groups, we are left with the following :

Married	40·4
Single	24·4
Difference	16·0±2·3

The difference between the rates for married and single is still seven times its standard error and is therefore highly significant. Conceivably this difference might be attributable to age. Figures with respect to mean age for both groups are as follows : Mean age of *single*=22·9 years ; mean age of *married*=23·7. It is unlikely that such a small difference is of itself enough to account for the differences recorded above. On the assumption that the ratio of married to single total sickness rates is the same for each group, we can now adjust the rates cited above with respect to the different proportions of married sick (0·1 and 0·2) respectively recorded for signal and other personnel. The actual sickness rate for signal personnel and the rate which would prevail if the nuptiality ratio for signal personnel accorded with that of the control group will be as 2÷(2—0·1) to 2÷(2—0·2), *i.e.* 18 : 19. The standardized total sickness rate for signal personnel computed on this basis is therefore 19 (23·4)÷18=24·7. This is well below the control rate (29·8) cited above, and we may therefore be confident that the total sickness rate of signal personnel is not higher than that of the group chosen for comparison. A corresponding adjustment raises the figure for Group B to 6·4, which is slightly higher than that of the control group (6·0).

Billets

Of the total strength 2,368 girls lived in A.T.S. quarters and 838 were on the lodging list. Of the latter the majority lived at home. It has been suggested that those living at home are subjected to extra strain due to home duties. The rates for these two groups, as given below, disclose no striking disparity, but it is worthy of note that many of those living at home may consult their own doctors when sick, and are also more likely to stay off work on their own initiative than those in A.T.S. quarters.

	Total Sick	*Group B*
A.T.S. Quarters	27·9	6·5
Lodging List	27·3	4·7
Difference	0·6±1·8	1·8±0·9

Underground Work

A large proportion of signal personnel work underground. Strength figures for those working underground in the different employment groups were not obtainable ; but in two units under consideration all signal personnel worked underground and in two other units about 50% did so. The sickness rates for signal personnel in these units are given below. The difference with respect to total sickness rate is not significant. The difference with respect to Group B may however be regarded as such, being 2·4 times its standard error. Thus there is no striking difference with respect to sickness rates of those working above and below ground.

	Total Sick	*Group B*
All below ground	23·6	7·7
Some below ground	21·8	3·8
Difference	1·8±3·1	3·9±1·6

Summary

An analysis of attendances at two London A.T.S. M.I. rooms over a 28-day period (in July and August 1945) with a view to classifying the effect on health of such circumstances as employment, living and working conditions and marriage leads to the following conclusions :

(*a*) Signal personnel do not have a higher total sickness rate than non-signal personnel.

(*b*) Cooks and orderlies have the highest sickness rates among employment groups covered by this enquiry ; and those employed with signal units have a significantly higher rate than those otherwise employed, a difference possibly due to longer hours necessitated by day and night shifts.

(*c*) Clerks in pay offices have a significantly higher total sickness rate than those employed on other clerical duties, and in particular a higher rate with respect to anxiety, other psychiatric disorders and general debility.

(*d*) A much higher sickness rate among married than among single women is not wholly attributable to higher incidence of gynaecological disorders nor to pregnancy.

(*e*) There seems to be little difference with respect to sickness rates of signal units respectively working entirely underground and partly above ground.

(*f*) In the absence of further information with respect to the extent to which auxiliaries on the lodging list consult private practitioners, there appears to be no difference between their liability to report sick and that of auxiliaries living in quarters.

TABLE 39

Sickness Rates based on Attendances per 100 Strength

TRADE	A	B	TOTAL SICK
I (i) S.B.O.	14·8	1·1±1·1	15·9±3·9
(ii) and (iii) T.P.O. and O.W.L.	15·5	8·8±1·4	24·3±2·0
(iv) O.K.L.	18·8	2·2±1·2	21·0±3·5
(v) O.W.K.S.	19·7	6·3±2·0	26·0±3·5
(vi) and (vii) Cipher H and MG	23·6	6·0±1·9	29·6±3·4
II (*a*) G.D.O.	32·6	6·9±1·3	39·5±2·4
(*b*) Cooks	17·5	15·6±2·8	33·1±3·7
(*c*) Clerks	16·7	2·2±0·5	18·9±1·3
(*d*) Pay clerks (machine)	17·3	8·6±3·7	25·9±5·8
(*e*) Pay clerks (others)	21·1	4·5±1·1	25·6±2·4
(*f*) Drivers	23·1	7·1±2·0	30·2±3·4
TOTAL	21·6	6·1±0·4	27·7±0·8

TABLE 40

Sickness Rates among Cooks and Orderlies Employed with Signal Units and with other Units

	Total Sick	Group B
Signal Cooks	47·2	28·3
Non-signal Cooks	26·5	9·7
Difference....	20·7±7·8	18·6±6·8

	Total Sick	Group B
Signal G.D.Os.	62·7	16·0
Non-signal G.D.Os.	34·2	4·8
Difference....	28·5±6·2	11·2±4·4

TABLE 41

Sickness Rates among Various Categories of Employment

TRADE	Upper Respiratory Infections	Anxiety, etc.	Skin Conditions and I.A.T.	Gynaecological Disorders	Alimentary Disorders	Injuries	All Others	TOTAL
I. (i) S.B.O.	5·7	5·7	1·1	—	1·1	—	2·3	15·9
(ii) and (iii) T.P.O. and O.W.L.	3·3	7·8	3·0	1·8	1·0	0·5	7·0	24·3
(iv) O.K.L.	5·1	7·2	3·6	0·7	—	1·4	2·9	21·0
(v) O.W.K.S.	5·1	1·3	10·8	2·5	1·3	—	5·1	26·0
(vi) and (vii) Cipher	3·8	4·4	4·4	0·5	1·1	1·1	14·3	29·6
II (*a*) G.D.Os.	5·1	2·9	8·8	2·5	1·0	1·5	17·6	39·5
(*b*) Cooks	1·2	0·6	11·4	4·2	0·6	5·4	9·6	33·1
(*c*) Clerks	1·9	2·6	1·8	2·1	1·3	1·1	8·1	18·9
(*d*) Pay clerks (Machine)....	1·7	1·7	8·6	5·2	1·7	1·7	5·2	25·9
(*e*) Pay clerks (Others)	3·6	7·1	1·2	1·8	1·2	0·3	10·4	25·6
(*f*) Drivers	3·6	5·9	1·8	2·4	4·1	3·0	9·5	30·2
TOTAL (All Trades)	3·8	4·8	4·4	2·2	1·3	1·4	9·8	27·7

TABLE 42

Relative Contributions of Certain Disease Groups to Various Categories of Wastage

Diagnosis	Full Duty	B.1	B.2	B.3	Total All Groups
Upper Respiratory Infections	10·5	7·5	24·1	36·4	12·9
Anxiety, etc.	16·4	17·0	19·4	15·2	16·8
Skin Conditions and I.A.T.	15·6	18·9	9·3	18·2	15·1
Gynaecological Disorders	7·6	3·8	11·3	3·0	7·6
Alimentary Disorders	4·6	3·8	8·3	9·1	5·2
Injuries	4·9	13·2	3·7	—	5·1
All others	40·3	35·8	24·1	18·2	37·3
TOTAL	100·0	100·0	100·0	100·0	100·0

B.1. Light Work; B.2. Off duty but allowed to stay in billets; B.3. Admitted to C.R.S. or hospital.

TABLE 43

Distribution of Certain Disease Groups among Various Categories of Wastage

Treatment	Upper Respiratory Infections	Anxiety, etc	Skin Conditions and I.A.T.	Gynaeco-logical Disorders	Alimentary Disorders	Injuries	All Others	Total All Diagnoses
Full duty	64·1	77·0	81·0	78·2	70·2	76·1	84·9	78·6
B.1	3·4	5·9	7·3	2·9	4·3	15·2	5·6	5·8
B.2	22·2	13·8	7·3	17·4	19·1	8·6	7·6	11·9
B.3	10·3	3·3	4·4	1·4	6·4	—	1·8	3·7
TOTAL	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

§5 INFESTATIONS AMONG A.T.S. INTAKES; JANUARY 1942-JUNE 1945

INFORMATION in this Section comes from returns submitted by A.T.S. training centres to the War Office (A.M.D.9) *via* commands. Throughout 1942 and the greater part of 1943 (Table 44) PEDICULUS CAPITIS Rates among intakes to the A.T.S. were consistently around 20% of total Intakes. There was a sharp drop in the last quarter of 1943 followed by a steep rise, reaching a maximum in the second quarter of 1944. During these nine months infestation rates almost trebled and by the second quarter of 1944 no less than *one in three* of all girls coming into the A.T.S. were infected. A slight fall followed, the rate reaching approximately 27% in the first quarter of 1945. (*See* Chart 12).

Many circumstances affect infestation rates among intakes, *e.g.*: (*a*) differential Selection Grade (S.G.), *i.e. intelligence*, levels; (*b*) geographical and occupational distribution; (*c*) age composition and (*d*) ratio of volunteers to conscripts. While it is not possible to draw firm conclusions without detailed information regarding these items, several interesting points emerge. With regard to S.G. levels, girls of S.G. 5 (lowest intelligence group) were no longer recruited into the A.T.S. from the beginning of 1942. The effect of this change does not therefore appear in the figures shown; but incomplete figures available for the last quarter of 1941 indicate that exclusion of S.G.5s was associated with a sharp drop of the infestation rate. The rise during the first half of 1944 cannot be due purely to a different domiciliary distribution of intakes, since there is a steep rise with respect to figures for all commands other than N. Ireland for which crude figures are too small to affect materially the overall picture. Indeed the proportion of total intakes made up by Scotland and N. Ireland (for which rates are highest) actually falls from the first quarter to the second quarter of 1944; and this would tend to reduce, rather than to raise, the overall rate. With regard to (*c*) and (*d*) it is worthy of comment that the proportion of volunteers among total intakes rose from under 50% in the first quarter of 1944 to 100% in the second quarter. During this period the infestation rate increased 100%. Since volunteers include a high proportion of girls under 19 years, at which age conscription starts, the sharp rise in the first half of 1944 may be largely due to a high incidence of pediculosis among very young girls.

Table 45 shows very striking differences between rates among intakes from different parts of the country. The rate among intakes in Scotland is much higher than in England. That of N. Ireland is spectacular. Nearly two out of every three girls recruited therefrom in 1943 and 1944 were infected. In every case the size of intake was sufficiently large to make the standard error with respect to sampling small; consequently, differences between commands are highly significant. (*See* Chart 12).

SCABIES rates are approximately one tenth of those with respect to Pediculus Capitis, being of the order of 2% of total Intakes. They, too, fall sharply in the last quarter of 1943, thereafter rising to reach a maximum at the end of 1944. Differences between commands are less consistent and less striking than those with respect to *Pediculus Capitis.*

TABLE 44

Pediculus Capitis and Scabies among Intakes to A.T.S. Training Centres by Quarters; Percentage of Recruits Infected; January 1942-June 1945

	Pediculus Capitis 1942	1943	1944	1945	Scabies 1942	1943	1944	1945
1st Quarter	19·4	21·2	17·6	26·6	2·2	2·1	1·6	2·9
2nd Quarter....	20·2	19·7	32·2	27·8	2·4	1·7	1·8	2·3
3rd Quarter	21·3	20·4	28·8		2·5	1·5	2·7	
4th Quarter	20·3	13·7	28·4		2·4	0·9	4·0	
Annual Total	20·2	20·2	25·8		2·3	1·8	2·5	
Size of Intake	107,646	46,228	19,145		107,646	46,228	19,145	

TABLE 45

Pediculus Capitis and Scabies among Intakes to A.T.S. Training Centres by Command; Percentage of Recruits Infected; January 1942-June 1945

	Pediculus Capitis 1942	1943	1944	1945 Jan-June	Scabies 1942	1943	1944	1945 Jan.-June
Eastern	12·3	10·9	—	13·9	2·7	2·6	—	2·1
Southern	7·6	—	—	11·8	1·9	—	—	0·7
South Eastern	10·6	10·1	16·1	—	1·9	0·5	1·2	—
Western	23·0	23·3	—	29·3	2·1	2·1	—	1·8
Northern	16·6	18·0	22·1	25·8	2·1	1·4	3·7	3·3
Scottish	33·8	29·5	32·8	34·2	3·1	2·6	2·5	2·4
N. Ireland	49·7	61·1	64·8	60·7	3·4	2·5	4·3	1·9
Total—U.K.	20·2	20·2	25·8	27·3	2·3	1·8	2·5	2·5

§6 MAN-POWER BUDGET OF MEDICAL WASTAGE IN THE U.K.

PRECEDING sections of Parts I and II have specified main sources of loss to the Army on medical grounds at each level of wastage, and have demonstrated what a comparatively small number of diseases are characteristic of each. What follows collates and co-ordinates such findings with a view to exhibiting an overall picture of NON-BATTLE medical wastage among army personnel stationed in this country. It deals mainly with the United Kingdom because: (*a*) records are more complete than for most other theatres; (*b*) it is the only theatre in which the presence of a large number of A.T.S. permits comparison between male and female rates. On the other hand, *all* invaliding takes place in the United Kingdom. So it is not possible to differentiate between invaliding of troops stationed in the United Kingdom and those evacuated from overseas. Figures cited for invalidings therefore include *all* cases other than battle casualties. Indeed, reception station cases (Low-grade Morbidity) alone are strictly exclusive. Even deaths and hospital admissions include a small number of cases evacuated to the United Kingdom from overseas. To complete the picture, data w.r.t. causes of medical downgrading and wastage at out-patient level should also appear, but the requisite information is not available. With the exception of cases treated *wholly* in reception stations, for which available data refer only to the second half of 1942, information in this survey relates to 1943, the first year for which records are relatively comprehensive, and the last during which the majority of troops were stationed in the United Kingdom. Consequently, the number of sick cases evacuated from overseas was small in relation to total sickness actually arising in the United Kingdom and figures cited do, in fact, represent the situation in this country within fairly narrow limits. One further consideration calls for comment. Mortality and hospital admissions include both officers and other ranks, but reception station cases include other ranks only because officers are not admitted to these units. Discharges also refer only to other ranks, because both medical criteria and administrative procedure w.r.t. discharge of officers are different from those applying to other ranks. Since officers make up only a small proportion of total strength this consideration does not introduce a material bias. A.T.S. discharges on family grounds are *not* included.

It should hardly be necessary to reiterate the importance to the Army of *non-battle* wastage, to which all of the troops are exposed all of the time, as opposed to battle wastage to which only some of the troops are exposed for some of the time. It is sufficient to mention two illustrative totals. From September 1939 to VJ Day the number of military other ranks discharged from the Army on account of disease or accidental injury was between 3 and 4 times as great as the number killed in battle during the same period, and more than 10 times as great as the number discharged as a result of wounds in action.

Relative Rates

The importance of a disease can be assessed both in relative and in absolute terms. Rates in Tables 46–48 deal with relative morbidity and wastage. Since we are concerned not only with frequency of occurrence of diseases but also with man-day wastage caused thereby, figures relating both to hospital and to reception station admissions are sub-divided into: (*a*) Morbidity and (*b*) Wastage. Tables 46-47 include all diseases which make a substantial contribution (at least 3%) to *any one* of the six classes cited. The order in which diseases are listed is governed by relative contribution to medical discharges, the main category of permanent wastage. It is not surprising that certain items, notably *Bronchitis* and *Rheumatic Conditions*, contribute appreciably to most classes of wastage among both males and females, whereas others, *e.g. Psychiatric Disorders* and *Neoplasm* are of dominating importance at certain levels and negligible at others. *Accidental Injuries* account for one-third of non-battle deaths among military personnel, one-seventh of hospital admissions and one-fifth of man-day wastage in hospital and convalescent depot. They make up less than 1 in 10 of discharges and of reception station cases. Among A.T.S. there is no class of wastage to which accidental injuries contribute as much as 10%. Rates shown in these tables enable us to select a short list of diseases that matter most at each level. Those cited in Table 48, arranged in descending order of magnitude within each category, refer to *diseases* alone, excluding accidental injuries.

Discharges are completely dominated by two or three items as are, to a lesser extent, deaths and reception station cases. Hospital cases are more widely distributed and even a comparatively long list of diseases incorporates less than a half of all cases. Another way of comparing the relative importance of individual diseases is to allot to each a rank based on its position in the detailed hierarchy of wastage w.r.t. each of the several classes cited. Where two or more diseases are of the same size they are all assigned to the same rank with an appropriate adjustment to the ranks of succeeding items. An asterisk indicates that a disease has no cases at all at the level specified. Table 49 shows the results of applying this procedure to the same list of diseases as appeared in Tables 46–47. Considerable differences between corresponding ranks in the six columns show that most diseases tend to specialise in one or two classes of wastage, and a disease which ranks high in all categories is the exception rather than the rule.

Overall Wastage Rates

Tables 46-49 have brought into focus diseases characteristic of each class of wastage; but throw no light on the *absolute* importance of individual diseases at each level, nor indeed of all diseases taken together, from the viewpoint of actual loss of man-power to the Army. For this purpose we are concerned not with relative but with absolute rates per 1,000 troops. Owing to documentary deficiencies discussed at length in previous papers, computation of such absolute rates presents greater difficulty than that of relative rates which are based essentially on a sampling procedure. It follows that rates quoted below may not be entirely accurate; but they are sufficiently close to the truth to disclose the general picture without undue distortion. The salient features of Table 50 are that disease and accidental injury in the United Kingdom during 1943 caused approximately 2 deaths, 20 invalids, 250 hospital admissions and 150 reception station admissions per 1,000 troops (military). Corresponding figures per 1,000 strength for A.T.S. (Table 51) are 0·7 deaths, 20 invalids, 200 hospital admissions and 400 admissions to reception station. But clearly each of these four categories represents a degree of wastage of a different order of importance. A reception station admission involves a far smaller loss to the Army than a hospital admission, and a hospital admission far less than a discharge from the Service. They are not therefore directly additive but must be combined in proportions appropriate to the degree of wastage involved. The main dichotomy is between deaths and invalids on the one hand, and hospital or reception station admissions on the other. At first we might be tempted to express the distinction by saying that the former represent a *permanent* loss to the Army and the latter involve only *temporary* absence from duty. From an administrative viewpoint, the distinction is not so clear-cut. Although admission to a medical unit leads to the temporary absence of a *particular individual*, wastage *to the Army* arising from the sum of all such admissions involves a permanent loss corresponding to the equilibrium level of the hospital (or reception station) population. In a static population not subject to considerable seasonal variation w.r.t. sickness rate, there is a steady flow both of admissions to, and of discharges from

hospital. Broadly speaking, any fresh admission is thus offset by a discharge. Once equilibrium is reached wastage arising from hospitalization can therefore be represented by the stable *hospital and convalescent depot population*, sometimes referred to as the average *constantly sick*, or average *medical non-effective strength*. The size of this population is a function both of the *admission rate* and of the *Mean Duration of Stay*. From this point of view, we may regard hospital or reception station cases as a hard core of non-effectiveness rather than a succession of temporary incidents. In the United Kingdom (1943) disease and accidental injury accounted for a hospital and convalescent depot population of approximately 30 per 1,000 with a further 3 per 1,000 in reception stations. It is therefore possible to allow for this class of wastage by regarding the *effective* strength of a body of troops as approximately 96·5% of *nominal* strength. Conversely, we are not compelled to look on death and discharge as permanent sources of wastage, albeit final from the viewpoint of the individual soldier. If the Army is entitled to a replacement for every soldier so lost to service, each case, in effect, involves an absence from duty equal only to the time interval necessary for training a new recruit to the standard of efficiency attained by the soldier he replaces, or at least to the point at which he is available for posting to active duty. On the basis of information supplied by the military training authorities the requisite period is here taken as six months. It is thus possible to compute the net effect of an annual loss of the services of 22 soldiers per 1,000, which is the number who die or are invalided, for a period of this length. This would be equivalent to an additional non-effective strength of 11 per 1,000. Within the scope of these assumptions we have therefore to deduct from the overall figure of nominal strength a total of approximately 45 per 1,000 made up as follows: 30 (hospital and convalescent depot) + 3 (reception station) + 10 (invaliding) + 1 (death). We thus arrive at a figure of 95·5% for the *effective* strength after accounting for all the major types of wastage attributable to disease and accidental injury.

The hard core of wastage in hospital and convalescent depot arising from A.T.S. admissions w.r.t. disease or accidental injury is of the order of 15 per 1,000 strength, with an additional 6 per 1,000 in reception stations. Thus effective A.T.S. strength can be taken as approximately 98% of nominal strength; and this is subject to an *annual* drain of slightly over 2% on account of death and invaliding. As before, we may assume that deaths and invalids are automatically replaced and that the real loss to service is equal only to the length of the training period. With the allowance of a shorter period of two months for training, wastage caused by death and invaliding represents an additional 3·5 non-effectives per 1,000 total strength. Due allowance for all medical wastage would thus reduce the A.T.S. effective strength to 97·5% of the nominal figure.

Treatment of statistics of wastage attributable to death and to invaliding, as outlined above, puts all the major sources of medical wastage on a common footing. At each level, relevant data resolve themselves into two elements: (*a*) frequency of occurrence; (*b*) period of non-effectiveness, either of the soldier himself or of the recruit who replaces him. It is therefore possible not only to assess *total* wastage on account of all disease and accidental injury, but also to compute for *each individual disease* an *overall* wastage rate incorporating data from each of the four levels, combined in proportions consistent with the assumptions set forth above. Results of this procedure w.r.t. all major diseases appear in Tables 52 and 53, which record both overall relative wastage rates and mean numbers non-effective as a result of all categories of wastage taken together. Although firm figures are not available for hospital wastage w.r.t. malignant neoplasm, it was possible to fill the gap by recourse to known data for death and invaliding since all cases who died or were discharged must first have been hospitalized. Mean duration of stay in hospital is obtainable by sample analysis. The classes of wastage at either end of the scale, viz. deaths on the one hand and reception station cases on the other, contribute little to overall rates cited w.r.t. military personnel; the former because of infrequent occurrence, the latter because of the short period of absence involved. The two main contributors to overall *male* rates are: (*a*) wastage in hospital and convalescent depot; (*b*) medical discharge. The former is the most important. Hospital wastage is also the dominating item among A.T.S.; but reception station cases, rather than medical discharges, take second place owing to high rates for minor sickness among females and to the relatively shorter period of training assumed to be necessary for replacement of auxiliaries medically discharged. *Accidental Injuries* among males account for nearly a fifth of *all* man-power wastage on medical grounds, and less than a tenth among females. *Psychiatric Disorders* emerge as the largest single cause of wastage resulting from *disease* w.r.t. both sexes. They make up one-seventh of the total among males and more than one-ninth among A.T.S. The second largest item among males is *Hernia* owing to its very heavy contribution to wastage in hospital and convalescent depot. Next in the hierarchy come *Peptic Ulcer*, *Bronchitis* and *Tuberculosis*. Among A.T.S., *Tonsillitis* and *Appendicitis* together account for about the same loss of man-power as Psychiatric Disorders; *Common Cold* and *Tuberculosis* follow in the scale of importance. With respect to both males and females the top five items account for approximately one-third of all man-days lost on account of sickness, but only two of the five, viz. Psychiatric Disorders and Tuberculosis are common to both sexes. The remaining items differ, as illustrated by the following summary of the *big five* w.r.t. each sex.

	Military		*A.T.S.*
1.		Psychiatric Disorders	
2.	Hernia		Tonsillitis
3.	Peptic Ulcer		Appendicitis
4.	Bronchitis		Common Cold
5.		T.B. All Types	

Sex Differentials

For the preparation of Tables 52-53, the end in view is essentially administrative. Comments in other Sections have emphasized considerable differences w.r.t. age composition of military and A.T.S., and hence the pitfalls of direct comparison between crude male and female rates if the end in view is to elucidate differences at a biological level. Nor is age the only pitfall; even age-standardized rates cannot suffice to eliminate the effect of differences arising from the application by medical authorities of *different standards* to men and women. The effect of this discrimination is very evident in the case of low-grade morbidity. It is clear that the threshold of admission to reception stations is not the same for military and A.T.S., since A.T.S. rates greatly exceed military w.r.t. every major item. Apparently medical boards also apply different standards, as illustrated by psychiatric cases, for which the age-standardized *discharge* rate among A.T.S. is more than twice as high as among military, whereas *hospital admissions* are actually lower. In the circumstances, it is therefore unprofitable to make a detailed comparison of sex-differentials at different wastage levels, because the influence of considerations outlined above varies so greatly not only between the different levels, but also between different diseases within the same category of wastage. Hospital morbidity rates are likely to be influenced least by such administrative considerations and they therefore comprise the most productive material for clarification of *real* sex differences. Crude and standardized sex-differentials w.r.t. both absolute and relative morbidity rates at this level have been dealt with at length in § 1, where there is also a discussion of differences between morbidity and discharge sex-differentials w.r.t. a number of major diseases.

TABLE 46

Crude Relative Rates at Different Levels of Medical Wastage ; U.K.; 1943 ; Military Personnel

DISEASE	Death	Discharge	Hospital		Low-grade	
			Morbidity	Wastage	Morbidity	Wastage
Psychiatric Disorders	0·6	**34·9**	**5·9**	**8·6**	0·8	1·0
Peptic Ulcer	**4·8**	**12·9**	1·3	1·3	—	—
T.B. All Types	**14·3**	**6·7**	1·0	1·5	—	—
Bronchitis	1·5	**4·8**	**3·3**	2·9	**4·5**	**5·0**
Rheumatic Conditions	—	**3·0**	2·6	**3·0**	**3·3**	**3·6**
Dyspepsia and Gastritis	—	1·1	2·5	1·9	**4·3**	**4·4**
Malignant Neoplasm	**13·9**	0·7	NA	NA	—	—
Nephritis	**3·2**	0·6	0·1	0·2	—	—
I.D.K.	0·1	0·5	1·7	**4·1**	—	—
Hernia	1·6	0·4	**4·1**	**10·0**	—	—
Cellulitis and I.A.T.	1·2	0·1	**3·5**	2·6	2·8	**3·1**
Pneumonia	**5·8**	0·1	1·8	**3·5**	0·1	0·1
Gonorrhoea	—	0·1	**5·3**	2·2	—	—
Impetigo	—	0·0	2·9	1·8	**4·6**	**6·9**
Appendicitis	**4·2**	0·0	2·0	**3·8**	0·1	0·0
Boils and Carbuncles	0·3	0·0	1·4	1·0	**3·5**	**3·8**
Tonsillitis	1·0	0·0	**4·7**	2·8	**9·4**	**10·0**
Scabies	—	0·0	0·9	0·4	**16·0**	**10·7**
Common Cold	—	—	2·5	0·8	**9·7**	**8·5**
All Other Diseases	47·5	34·1	52·5	47·6	40·9	42·9
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0
ALL DISEASES	67·8	93·1	85·4	78·8	90·8	90·5
ALL ACCIDENTS	32·2	6·9	14·6	21·2	9·2	9·5
ALL CASES	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 47

Crude Relative Rates at Different Levels of Medical Wastage ; U.K.; 1943 ; A.T.S.

DISEASE	Death	Discharge	Hospital		Low-grade	
			Morbidity	Wastage	Morbidity	Wastage
Psychiatric Disorders	—	**49·3**	**4·2**	**6·2**	1·8	1·9
T.B. All Types	**27·0**	**11·0**	1·0	2·8	—	—
Rheumatic Conditions	—	2·5	2·9	**3·4**	2·5	**3·1**
Bronchitis	—	2·1	2·7	2·5	2·9	**3·7**
Malignant Neoplasm	**5·4**	0·5	NA	NA	—	—
Dyspepsia and Gastritis	—	0·2	1·3	0·9	**3·7**	**3·6**
Pneumonia	**10·8**	0·1	1·2	2·0	—	—
Appendicitis	**5·4**	0·1	**5·9**	**9·0**	0·3	0·3
Boils and Carbuncles	—	—	0·7	0·6	2·6	**3·0**
Tonsillitis	—	—	**8·4**	**6·2**	**8·7**	**10·5**
Scabies	—	—	**3·1**	0·8	**15·6**	**11·1**
Common Cold	—	—	2·6	1·1	**14·6**	**13·3**
All Other Diseases	51·4	34·2	66·0	64·5	47·3	49·5
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0
ALL DISEASES	90·2	98·3	92·9	90·7	94·7	94·3
ALL ACCIDENTS	9·8	1·7	7·1	9·3	5·3	5·7
ALL CASES	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 48

Diseases Characteristic of each Wastage Level

(a) **MILITARY PERSONNEL**

Death		Discharge		Hospital				Reception Station			
	%		%	Morbidity	%	Wastage	%	Morbidity	%	Wastage	%
T.B.	14·3	Psychiatric Disorders	34·9	Psychiatric Disorders	5·9	Hernia	10·0	Scabies	16·0	Scabies	10·7
Malignant Neoplasm	13·9	Peptic Ulcer	12·9	Gonorrhoea	5·3	Psychiatric Disorders	8·6	Common Cold	9·7	Tonsillitis	10·0
Pneumonia	5·8	T.B.	6·7	Tonsillitis	4·7	I.D.K.	4·1	Tonsillitis	9·4	Common Cold	8·5
Peptic Ulcer	4·8	Bronchitis	4·8	Hernia	4·1	Appendicitis	3·8	Impetigo	4·6	Impetigo	6·9
Appendicitis	4·2			Cellulitis	3·5	Pneumonia	3·5	Bronchitis	4·5	Bronchitis	5·0
				Bronchitis	3·3	Rheumatic Conditions	3·0	Dyspepsia and Gastritis	4·3	Dyspepsia and Gastritis	4·4
				Impetigo	2·9	Bronchitis	2·9				
COLLECTIVE CONTRIBUTION	43%		59%		30%		36%		49%		46%
(b) **A.T.S.**											
T.B.	27·0	Psychiatric Disorders	49·3	Tonsillitis	8·4	Appendicitis	9·0	Scabies	15·6	Common Cold	13·3
Pneumonia	10·8	T.B.	11·0	Appendicitis	5·9	Tonsillitis	6·2	Common Cold	14·6	Scabies	11·1
Meningococcal Infection	8·1			Psychiatric Disorders	4·2	Psychiatric Disorders	6·2	Tonsillitis	8·7	Tonsillitis	10·5
Diphtheria	8·1			Scabies	3·1	Rheumatic Conditions	3·4	Dyspepsia and Gastritis	3·7	Bronchitis	3·7
				Rheumatic Conditions	2·9					Dyspepsia and Gastritis	3·6
COLLECTIVE CONTRIBUTION	54%		60%		25%		25%		43%		42%

TABLE 49

Ranks at Different Levels of Medical Wastage ; U.K. (1943)
(*a*) **Military Personnel**

DISEASE	Death	Discharge	Hospital		Low-grade	
			Morbidity	Wastage	Morbidity	Wastage
Psychiatric Disorders	17	1	1	2	12	12
Peptic Ulcer	4	2	20	18	**	**
T.B. All Types	1	3	23	17	**	**
Bronchitis	9	4	6	7	5	5
Rheumatic Conditions	**	5	8	6	8	8
Dyspepsia and Gastritis	**	11	10	12	6	6
Malignant Neoplasm	2	14	NA	NA	**	**
Nephritis	6	15	29	29	**	**
I.D.K.	24	16	15	3	**	**
Hernia	8	17	4	1	**	**
Cellulitis and I.A.T.	11	21	5	9	9	9
Pneumonia	3	22	14	5	20	20
Gonorrhoea	**	23	2	11	**	**
Impetigo	**	25	7	14	4	4
Appendicitis	5	26	12	4	21	21
Boils and Carbuncles	20	27	17	21	7	7
Tonsillitis	12	31	3	8	3	2
Scabies	**	31	24	27	1	1
Common Cold	**	**	10	24	2	3

(*b*) **A.T.S.**

DISEASE	Death	Discharge	Hospital		Low-grade	
			Morbidity	Wastage	Morbidity	Wastage
Psychiatric Disorders	**	1	3	2	8	9
T.B. All Types	1	2	15	5	**	**
Rheumatic Conditions	**	4	5	4	7	6
Bronchitis	**	5	6	6	5	4
Malignant Neoplasm	5	13	NA	NA	**	**
Dyspepsia and Gastritis	**	18	12	19	4	5
Pneumonia	2	20	13	10	**	**
Appendicitis	5	22	2	1	16	16
Boils and Carbuncles	**	**	20	25	6	7
Tonsillitis	**	**	1	2	3	3
Scabies	**	**	4	20	1	2
Common Cold	**	**	7	13	2	1

** No Cases

TABLE 50

Crude Absolute Rates per 100,000 Strength at Different Levels of Medical Wastage ; U.K.; 1943 ; Military Personnel

DISEASE	Death	Discharge	Hospital Admission	Rec. Stat. Admission
Psychiatric Disorders	1	659	1,313	120
Peptic Ulcer	7	244	289	—
T.B. All Types	20	127	223	—
Bronchitis	2	91	734	658
Rheumatic Conditions	—	56	579	485
Dyspepsia and Gastritis	—	20	556	636
Malignant Neoplasm	20	14	NA	—
Nephritis	5	12	22	—
I.D.K.	0	9	378	—
Hernia	2	8	913	—
Cellulitis and I.A.T.	2	2	779	408
Pneumonia	8	1	401	11
Gonorrhoea	—	1	1,180	—
Impetigo	—	1	645	666
Appendicitis	6	1	445	10
Boils and Carbuncles	0	1	312	508
Tonsillitis	1	0	1,046	1,358
Scabies	—	0	200	2,316
Common Cold	—	—	556	1,406
All Other Diseases	67	642	11,686	5,902
ALL DISEASES	141	1,889	22,257	14,484
ALL ACCIDENTS	67	140	3,793	1,452
ALL CASES	208	2,029	26,050	15,936

TABLE 51

Crude Absolute Rates per 100,000 Strength at Different Levels of Medical Wastage ; U.K.; 1943 ; A.T.S.

DISEASE	Death	Discharge	Hospital Admission	Rec. Stat. Admission
Psychiatric Disorders	—	1,003	864	680
T.B. All Types	16	225	206	—
Rheumatic Conditions	—	51	596	939
Bronchitis	—	43	555	1,080
Malignant Neoplasm	3	10	NA	—
Dyspepsia and Gastritis	—	4	267	1,430
Pneumonia	7	3	247	—
Appendicitis	3	2	1,213	98
Boils and Carbuncles	—	—	144	1,015
Tonsillitis	—	—	1,727	3,300
Scabies	—	—	637	5,994
Common Cold	—	—	535	5,434
All Other Diseases	32	698	13,573	18,314
ALL DISEASES	61	2,039	20,564	38,284
ALL ACCIDENTS	7	35	1,573	2,166
ALL CASES	67	2,074	22,137	40,450

TABLE 52

Overall Wastage Rates* ; U.K.; 1943 ; Military Personnel

DISEASE	Relative Rates	Numbers Non-Effective per 100,000 Strength
Psychiatric Disorders	15·0	529
Hernia	6·6	233
Peptic Ulcer	4·4	155
Bronchitis	3·5	124
T.B. All Types	3·1	108
Rheumatic Conditions	3·0	105
I.D.K.	2·8	98
Appendicitis	2·5	90
Tonsillitis	2·5	88
Pneumonia	2·4	85
Cellulitis and I.A.T.	1·9	68
Dyspepsia and Gastritis	1·8	64
Impetigo	1·6	57
Gonorrhoea	1·4	51
Common Cold	1·1	38
Scabies	1·0	34
Boils and Carbuncles	0·9	32
Malignant Neoplasm	0·6	23
Nephritis	0·4	13
All Other Diseases	43·5	1,538
ALL DISEASES	100·0	3,533
ALL DISEASES	82·6	3,533
ALL ACCIDENTS	17·4	742
ALL CASES	100·0	4,275

TABLE 53

Overall Wastage Rates* ; U.K.; 1943 ; A.T.S.

DISEASE	Relative Rates	Numbers Non-Effective per 100,000 Strength
Psychiatric Disorders	11·6	261
Tonsillitis	6·3	143
Appendicitis	5·4	123
Common Cold	4·0	91
T.B. All Types	3·4	78
Scabies	3·3	75
Rheumatic Conditions	3·2	72
Bronchitis	2·7	62
Dyspepsia and Gastritis	1·5	33
Pneumonia	1·2	28
Boils and Carbuncles	1·1	25
Malignant Neoplasm	0·2	4
All Other Diseases	56·0	1,267
ALL DISEASES	100·0	2,262
ALL DISEASES	92·7	2,262
ALL ACCIDENTS	7·3	179
ALL CASES	100·0	2,441

*For basis of computation see comments above (p. 52)

Part III. MORBIDITY IN OVERSEAS THEATRES

§1 OVERALL MEDICAL WASTAGE IN THE MIDDLE EAST DURING 1943 AND 1944

THE object of the following is: (*a*) to elucidate what diseases were important as a cause of admission to hospital, mortality and of man-day wastage in the Middle East; (*b*) to determine the seasonal incidence of such diseases. With this end in view, Central Statistical Section, M.E.F., in co-operation with D.D.H., M.E.F. and with Consultant in Army Medical Statistics, undertook extensive tabulation of A.Fs. I1220 received from all Middle East hospitals and coded at 2nd Echelon. Figures presented in the ensuing tables were derived from these Hollerith tabulations. Since the incidence of a disease can be, and usually is, considerably affected by each of these variables, no firm biological conclusions can be drawn from such raw data without standardization of all figures for age, for length of service overseas and for locality. For various reasons, it was unfortunately impossible to standardize crude rates based thereon. A.F. I1220 does not provide any information with respect to length of service overseas or locality; and though it does provide information with respect to age, the strength-age distribution of the Middle East Force was not separately recorded until March 1945. It is possible to arrive at an estimate of the strength-age distribution of the Force as a whole; but any estimate of the age distribution of *officers* or of any arm of the Service would have a considerable margin of error, particularly in the youngest and oldest age groups. We do know, however, that in general other ranks are younger than officers and that combatant arms of the Service, e.g. Infantry, are younger than the non-combatant. *Ceteris paribus*, we may therefore expect: (*a*) higher incidence among other ranks and front-line troops of communicable diseases known to affect the young more commonly; (*b*) a higher incidence of organic disorders among officers and troops at base. A.F. I1220 does not record length of time spent in convalescent depot in the Middle East for the reason that it was not administratively practicable for hospital record cards to accompany patients transferred to convalescent depots. A soldier's hospital record card went, therefore, to Central Statistical Section on his discharge from hospital, and not, as in the United Kingdom, on his discharge from convalescent depot. A.F. I1220, however, did record whether or not the patient went to convalescent depot. To provide data for an estimate of total man-day wastage, the Central Statistical Section accordingly undertook a sampling survey of average time spent in convalescent depot with respect to diseases of which there was a large enough number of cases to provide a sufficient sample. The product of this figure and the number of cases sent to convalescent depot added to total man-days spent in hospital gives an estimate of all man-day wastage.

Morbidity and Hospital Wastage

The most striking feature of Tables 54 to 57 is the high rate for diseases of the *Ear*, *Nose* and *Throat*, and in particular for *Tonsillitis* and *Pharyngitis*, both among officers and other ranks. These diseases were collectively responsible for about 15% of all admissions to hospital and for about 10% of all man-day wastage. *Bacillary Dysentery*, *Malaria*, *Sandfly Fever* and *P.U.O.* also rank high as a cause of morbidity and wastage, but whereas Dysentery and P.U.O. maintained much the same level in 1944 as in 1943, the relative incidence of Sandfly Fever fell sharply between 1943 and 1944 and that of Malaria rose, the increase being confined to the B.T. type (Table 55). There are at least two possible—not incompatible—explanations of the higher malaria rate in 1944: (*a*) that a large number of troops had moved from the dry and healthy desert area to localities where Malaria is more prevalent; (*b*) that the ratio of *relapses* to *primary attacks* was higher in 1944, when the majority of the Middle East Army had been in the theatre for over a year. Reasons for a lower *Sandfly Fever* rate are less obvious. One possibility is that conditions of active service prevailed in 1943. Hence facilities for accurate diagnosis were lacking. The contribution of other diseases to total morbidity is remarkably constant during the two years. *I.D.K.* (internal derangement of the knee), of which the incidence fell sharply in 1944, is an exception. With regard to officer-other rank differences *Infective Hepatitis* is the most noteworthy item. As is well known, its incidence is much higher among officers; and since it is a disease most common among the young, the effect of age-standardization would be to increase the difference shown in Table 54. *Malaria*, *Scabies* and *Venereal Disease* are noticeably higher among other ranks.

The contributions of individual hospitalized diseases to man-day wastage (Tables 58-64) present a somewhat different picture. Malaria now becomes the most important *single* source of man-day wastage, and Diseases of the Skin among *groups* exhibited in Table 61 are the most important. As would be expected, the proportion of injuries to total wastage is much higher than the proportion of injuries to all hospital admissions. The same remarks which were made above with respect to morbidity differentials apply to wastage. The effect of weighting the wastage rates to take into account duration of stay in convalescent depots is very slight.

Certain major items of Table 54 are diseases which rarely if ever occur in the United Kingdom. It is therefore instructive to compare relative contributions of diseases to total morbidity in the United Kingdom with relative contributions of the same diseases to morbidity in M.E.F. after *exclusion* of diseases not indigenous to the United Kingdom. The relevant data are as below (*see* also Chart 13).

Comparison of Relative Morbidity and Wastage Rates w.r.t. Various Diseases in M.E.F. and United Kingdom ; British Army Other Ranks ; 1943

	MORBIDITY		*WASTAGE*	
	M.E.F.	*U.K.*	*M.E.F.*	*U.K.*
Psychiatric Disorders	4·8	5·9	6·1	8·6
Infective Hepatitis	6·8	1·4	9·7	1·8
Tonsillitis and Pharyngitis	16·4	4·7*	8·4	2·8*
Hernia	1·6	4·1	3·4	10·0
Dyspepsia and Gastritis	2·6	2·5	1·8	1·9
Appendicitis	1·8	2·0	3·0	3·8
Pneumonia	1·8	1·8	2·7	3·5
I.D.K.	0·9	1·7	1·3	4·1
Synovitis and Arthritis	0·8	1·4	1·0	1·9
Peptic Ulcer	0·5	1·3	1·0	1·3
Otitis Media and Externa	4·4	1·2†	3·3	1·1†
Tuberculosis	0·4	1·0	2·0	1·5
Gonorrhoea	3·8	5·3	2·7	2·2
Syphilis	1·4	1·2	1·2	0·8
Toxic Jaundice	0·1	0·6	0·3	0·7
All Diseases	100·0	100·0	100·0	100·0
Ratio : Toxic Jaundice / Syphilis	7%	50%		

* Tonsillitis only. † Otitis Media only.

As we might expect, diseases which would place a man in Category C and therefore make him unfit for overseas service make a larger contribution to total admissions among troops in the United Kingdom viz: *Psychiatric Disorders*, *Hernia*, *I.D.K.* and *Synovitis* and *Arthritis*. *Appendicitis*, *Dyspepsia and Gastritis* have much the same relative incidence in the two theatres. *Tonsillitis* and *Pharyngitis*, *Otitis Media* and *Infective Hepatitis* are all relatively more prevalent in the Middle East. Of the other diseases, *Peptic Ulcer* and *Tuberculosis* are proportionately higher in the United Kingdom. A noteworthy feature of this table is the ratio of cases of Toxic Jaundice to cases of Syphilis. That the ratio is much lower in M.E.F. may indicate a disposition on the part of medical officers either to diagnose Toxic Jaundice as Infective Hepatitis in a country where the incidence of the latter is high or to diagnose Infective Hepatitis as Toxic Jaundice in a country where the incidence of Infective Hepatitis is low.

Tables 65 to 67 show the average length of time spent in hospital and convalesent depot with respect to different diseases. Of the major diseases, *Tonsillitis* and *Pharyngitis*, *Sandfly Fever*, *P.U.O.*, *Common Cold* and *Scabies* all have a very short stay in hospital and convalescent depot. At the other end of the scale are *Diphtheria*, *Amoebiasis* and *Hernia*. Duration of stay with respect to different types of *Psychiatric Disorder* vary considerably from about 70 days in the case of Psychoses to about 30 days in the case of Psychoneuroses. Few of the minor diseases had a short stay in hospital, *Tuberculosis* being the highest with a hospitalization period of over four months. Time spent in hospital for each disease varied little between 1943 and 1944. Such differences as exist are probably a result of changes in policy with regard to evacuation of patients.

Mortality and Fatality

Almost 40% of all deaths in the Middle East during 1943 and 1944 (Table 68) were caused by Injuries and Burns. The disease which contributed the highest number of deaths was *Enteric Fever*, with a relative mortality of about 7%. *Neoplasms*, *Poliomyelitis*, *Smallpox* and *Pneumonia* were other diseases with a high mortality rate in both years. Fatality rates present a somewhat different picture. The most lethal diseases were the *Rickettsiases*, *Poliomyelitis*, *Smallpox*, *Meningococcal Infection* and *Bacterial Endocarditis*, all with a fatality of over 10% in 1943. The proportion of Injuries which proved fatal was just under 2%.

Comparison of Relative Mortality and Absolute Fatality Rates per 1,000 Cases in M.E.F. and United Kingdom ; British Army Other Ranks ; 1943

	RELATIVE MORTALITY		*FATALITY PER 1,000 CASES*	
	M.E.F.	*U.K.*	*M.E.F.*	*U.K.*
Tuberculosis	6·8	14·9	32·3	97·6
Neoplasms	16·1	12·1	22·3	—*
Pneumonia	10·2	6·2	10·8	20·4
Peptic Ulcer	1·7	5·2	6·6	23·2
Appendicitis	4·2	4·3	4·3	13·7
Nephritis	3·4	2·6	36·0	144·6
Meningococcal Infection	1·7	2·6	125·0	138·1
Hernia	0·9	1·8	1·0	2·5
Bronchitis	—	1·5	—	2·8
Diphtheria	7·6	1·5	6·6	28·6
Otitis Media	1·7	1·1	1·1	5·6
Toxic Jaundice	2·5	1·1	34·9	10·8
Poliomyelitis	15·3	0·3	236·8	—*
Infective Hepatitis	6·8	1·1	1·8	—*
Other Diseases	21·2	43·7	....	....
All Diseases (*excl.* tropical)	100·0	100·0	....	....
All Diseases (*incl.* tropical)	61·1	67·0	....	....
All Injuries	38·9	33·0	17·2	18·0
Total Deaths	100·0	100·0	....	....

* Figures not available.

Even though deaths from tropical diseases are excluded from the total of deaths from disease, we should exercise caution in comparing mortality and fatality in M.E.F. with mortality and fatality in the United Kingdom, since some cases may have died after evacuation from overseas, and may thus have been excluded from figures at our disposal. Mortality rates are to a certain extent proportional to the incidence of a disease and we would not therefore expect a 1 : 1 ratio of mortality in two theatres whose relative morbidity rates are by no means identical. With the noticeable exception of *Diphtheria*, *Poliomyelitis* and *Infective Hepatitis*, the *rank order* of mortality from non-tropical diseases is fairly similar in the two theatres, with *Tuberculosis*, *Neoplasms* and *Pneumonia* at the top. After the exclusion of Burns, to which British troops in the Middle East were particularly liable, the contribution of Injuries to all deaths is about the same as in the United Kingdom. The comparative table of mortality and fatality in M.E.F. and the United Kingdom above shows that with one exception, the fatality rate for every disease is higher in the United Kingdom. *Inter alia* this may be due to the evacuation of hospital cases from M.E.F., in which case we would have reason to expect the discrepancy to be less striking in respect of conditions which would lead to recovery or to an *early* death. This is true of Injuries and of Meningococcal Infection. It is not true of Appendicitis nor of Diphtheria. The one exception mentioned above is *Toxic Jaundice*, which appears to be more fatal in the Middle East. Diagnosis of cases of Toxic Jaundice as Infective Hepatitis might well be a sufficient explanation of this differential.

Seasonal Variation w.r.t. Hospitalized Diseases

To facilitate comparison of the seasonal trend of one disease with that of another by eliminating differences of monthly rates due to a higher or lower total incidence of a disease, the distributions in Table 69 represent mean monthly rates per 100,000 strength with respect to each disease, shown as percentages of the annual rate for 1943. Diseases with a Coefficient of Variation greater than 60, 60–30, and less than 30 are shown below. The Coefficient of Variation is a measure of dispersion from the mean monthly value, i.e. 8·3%. If the incidence of a disease were the same in each month, the Coefficient of Variation would be 0, and a high Coefficient of Variation indicates that the disease fluctuates widely about the mean. But a disease with a high Coefficient of Variation does not necessarily have a pronounced *seasonal trend*, *e.g.* Chancroid and Psychoses, and the Coefficients of Variation shown below should be studied in relation to Table 69.

Coefficient of Variation > 60	
Sandfly Fever	93·6
P.U.O.	86·8
Infective Hepatitis	84·9
Malaria—All	81·3
B.T.	*83·2*
M.T.	*84·2*
Bacillary Dysentery—All	64·8
Shiga	*89·9*
Flexner	*131·1*
Diphtheria	62·5

Coefficient of Variation 60–30	
Psychoses	52·9
Chancroid	46·2
Otitis Media	45·6
Sinusitis	43·1
Psychoneuroses	39·3
Urethritis G.C.	30·9
Scabies	30·1

Coefficient of Variation < 30	
Common Cold	29·8
Amoebiasis	28·0
Conjunctivitis	25·0
Haemorrhoids	23·3
Pneumonia	22·1
Tonsillitis and Pharyngitis	20·5
Boils and Carbuncles	19·6
Impetigo	18·0
Early Syphilis	17·9
Dermatitis	16·9
Bronchitis	15·6
Appendicitis	15·4
Dyspepsia and Gastritis	14·8
Keratitis	14·4

Diseases which displayed a striking seasonal swing had peak incidence during the following periods:

Bacillary Dysentery—All	August —November
Malaria—M.T.	September —December
Malaria—B.T.	August —October
Sandfly Fever	July —September
P.U.O.	July —October
Infective Hepatitis	November —January
Sinusitis	July —September
Otitis Media	July —September
Diphtheria	December —February

The high summer incidence of *Sinusitis* and *Otitis Media* has been discussed in the Section of Laryngology of the Proceedings of the Royal Society of Medicine (XXIX, 9 July, 1946). The main explanation given was the greater prevalence of infected dust during the hot dry months. Another likely mode of transmission mentioned is insufficiently chlorinated swimming pools, frequented by the troops more often in summer. Differences between the seasonal distributions of *Shiga*, *Flexner* and all Bacillary Dysentery call for explanation. The apparent peak incidence of the Shiga and Flexner types in early summer is associated with a fall in the proportion of Bacillary Dysenteries typed, from about 40% in the first half of 1943 to less than 1% in the latter months. This was the result of an administrative instruction issued in June, 1943 by G.H.Q. Middle East, to the effect that no case of Bacillary Dysentery should be typed unless it failed to respond to standard treatment. An increase of *Diphtheria* during the winter months is in keeping with the seasonal trend of this disease in C.M.F., though the same is not true of the British Army in the United Kingdom.

Summary

The outstanding fact emerging from this analysis is the large contribution of diseases of the Ear, Nose and Throat to total morbidity in the Middle East.

TABLE 54

Relative Morbidity Rates w.r.t. Major Diseases ; British Army ; Middle East ; 1943 and 1944

	Other Ranks		Officers	
	1943	1944	1943	1944
Tonsillitis and Pharyngitis	10·97	10·10	10·04	10·25
Bacillary Dysentery	8·34	7·97	8·82	6·96
Malaria	8·16	15·04	5·89	10·00
Sandfly Fever	7·14	3·12	9·89	4·38
P.U.O.	6·37	7·06	7·93	8·39
Infective Hepatitis	4·53	3·51	9·72	6·90
Urethritis (incl. Gonorrhoea)	3·23	2·70	1·22	1·01
Psychiatric Disorders	3·18	3·67	2·54	3·29
Impetigo	3·18	1·83	1·50	0·78
Bronchitis	3·10	3·26	2·07	2·46
Otitis Media and Externa	2·93	2·65	1·84	2·23
Common Cold	2·48	3·25	2·22	2·85
Scabies	2·17	1·02	0·83	0·32
Dyspepsia and Gastritis	1·72	1·75	2·32	3·06
Boils and Carbuncles	1·70	2·14	1·63	2·51
Dermatitis	1·67	1·71	1·02	1·29
Rheumatic conditions—non articular	1·61	1·57	1·65	2·19
articular	0·27	0·22	0·23	0·29
Haemorrhoids	1·54	1·48	1·59	1·85
Diphtheria	1·43	0·84	1·19	0·91
Amoebiasis (incl. Amoebic Dysentery)	1·29	1·12	3·09	2·23
Appendicitis	1·23	1·22	1·30	1·75
Pneumonia	1·17	1·70	1·68	2·19
Hernia	1·09	1·30	0·82	1·05
Epidermophytosis	1·00	0·63	0·88	0·68
Syphilis	0·97	1·20	0·11	0·19
Others	17·57	17·92	17·94	19·97
TOTAL	100·00	100·00	100·00	100·00

TABLE 55

More Detailed Breakdown of Rates shown in Table 54

	Other Ranks		Officers	
	1943	1944	1943	1944
Bacillary Dysentery				
Shiga	0·13	0·02	0·27	—
Flexner	0·53	0·09	0·69	0·21
Sonne	0·11	0·01	0·34	—
Unspecified	7·58	7·86	7·52	6·76
Malaria				
B.T.	6·20	13·59	3·93	7·46
M.T.	1·03	0·75	1·03	1·56
Q.	0·03	0·01	—	—
Clinical	0·90	0·70	0·93	0·97
Blackwater Fever	0·003	0·002	—	—
Jaundice				
Infective Hepatitis	4·53	3·51	9·72	6·90
Weil's Disease	0·001	—	0·03	—
Post-arsphenamine	0·09	0·22	—	—
Venereal Disease				
Syphilis—early	0·58	0·86	0·06	0·13
late	0·02	0·03	0·04	—
congenital or unspec.	0·37	0·31	0·01	0·06
Urethritis—G.C.	2·53	1·65	1·05	0·44
non-specific and unspec.	0·70	1·05	0·17	0·57
Chancroid	0·12	0·50	0·04	0·04
Lymphogranuloma	0·02	0·02	—	—
Other	0·16	0·06	0·01	0·02

	Other Ranks		Officers	
	1943	1944	1943	1944
Psychiatric Disorders				
Psychoses	0·31	0·44	0·43	0·51
Psychoneuroses	2·46	2·65	1·85	2·61
Psychopathic Personality	0·23	0·33	0·19	0·11
Mental Deficiency	0·17	0·23	—	—
Other	0·01	0·03	0·06	0·06
Diphtheria				
Faucial, Laryngeal and Nasal	0·57	0·46	0·64	0·61
Cutaneous	0·06	0·05	0·03	0·02
Unspecified and other	0·80	0·34	0·52	0·28
Amoebiasis				
Amoebic Hepatitis and Tropical Abscess	0·15	0·14	0·55	0·26
Dysentery—protozoal	1·05	0·90	2·13	1·62
Unspecified	0·09	0·08	0·41	0·36
Pneumonia				
Primary Atypical	0·03	0·16	0·13	0·42
Lobar	0·63	0·88	0·93	0·95
Secondary (incl. influenzal)	0·26	0·29	0·31	0·29
Unspecified	0·25	0·37	0·32	0·53
Epidermophytosis				
Feet	0·61	0·37	0·70	0·49
Groin	0·13	0·10	0·10	0·02
Other	0·26	0·15	0·08	0·17

TABLE 56

Relative Morbidity Rates w.r.t. Minor Diseases ; British Army ; Middle East ; 1943 and 1944

	Other Ranks		Officers	
	1943	1944	1943	1944
Varicose Veins	0·90	1·16	0·61	0·65
Neoplasms—all	0·90	1·02	0·56	0·95
Benign and unspecified	*0·82*	*0·92*	*0·43*	*0·82*
Malignant	*0·07*	*0·10*	*0·13*	*0·13*
Sinusitis	0·79	0·81	1·93	1·96
Conjunctivitis	0·74	0·73	0·29	0·25
I.D.K.	0·57	0·07	0·40	0·04
Synovitis and Arthritis	0·53	0·31	0·41	0·34
Keratitis	0·50	0·49	0·23	0·19
Influenza	0·44	0·46	0·79	0·49
Foot deformities	0·44	0·25	0·08	0·11
Cystitis and Pyelitis	0·43	0·32	0·52	0·51
Peptic Ulcer—all	0·32	0·59	0·69	1·31
Gastric	*0·06*	*0·12*	*0·09*	*0·19*
Duodenal	*0·23*	*0·42*	*0·57*	*0·91*
Unspecified	*0·03*	*0·05*	*0·03*	*0·21*
Enteric Fever—all	0·28	0·24	0·30	0·35
Typhoid	*0·16*	*0·17*	*0·19*	*0·19*
Para. A, B, C	*0·06*	*0·03*	*0·06*	*0·08*
Clinical	*0·07*	*0·04*	*0·05*	*0·08*
Rheumatic Fever	0·27	0·23	0·15	0·19
T.B.—all	0·26	0·39	0·40	0·63
Pulmonary	*0·21*	*0·36*	*0·36*	*0·44*
Other sites	*0·05*	*0·03*	*0·04*	*0·19*

	Other Ranks		Officers	
	1943	1944	1943	1944
Sciatica	0·26	0·38	0·45	0·34
Helminthiasis—all	0·26	0·30	0·95	0·95
Schistosomiasis	*0·01*	*0·01*	*0·01*	*0·02*
Ankylostomiasis	*0·002*	*0·01*	—	—
Other	*0·24*	*0·28*	*0·94*	*0·93*
Leishmaniasis—all	0·24	0·07	0·17	0·02
Cutaneous	*0·24*	*0·06*	*0·17*	*0·02*
Visceral	*0·01*	*0·01*	—	—
Unspecified	*0·003*	*0·004*	—	—
Vincent's Angina	0·14	0·16	0·27	0·36
Rickettsiasis—all	0·13	0·03	0·12	0·04
Typhus—Unspecified	*0·10*	*0·03*	*0·09*	*0·04*
Murine	*0·03*	*0·01*	*0·03*	—
Trench fever	*0·001*	—	—	—
Nephritis	0·12	0·10	0·18	0·06
Heat Exhaustion	0·11	0·03	0·11	0·08
Heat Hyperpyrexia	0·01	0·01	0·01	—
Gingivitis	0·11	0·07	0·20	0·17
Effort Syndrome	0·10	0·07	0·13	0·08
Smallpox	0·05	0·17	0·05	0·19
Others	91·10	91·54	90·00	89·74
TOTAL	100·00	100·00	100·00	100·00

TABLE 57

Relative Casualty Rates w.r.t. Specialist Diagnostic Groups ; British Army ; Middle East ; 1943 and 1944

	Other Ranks		Officers	
	1943	1944	1943	1944
Diseases of Ear, Nose and Throat	16·35	14·99	15·10	16·00
Diseases of Skin	10·19	10·26	6·24	8·05
Psychiatric Disorders	3·18	3·67	2·54	3·29
Diseases of the Eye	1·87	1·71	0·93	0·72
Diseases of the Nervous System	1·29	1·26	1·65	1·62
Diseases of Mouth, Teeth and Gums	0·84	0·81	1·39	2·19
Other Diseases	66·28	67·30	72·13	68·12
All Diseases	100·00	100·00	100·00	100·00
ALL DISEASES	92·99	94·13	93·07	94·73
ALL INJURIES	7·01	5·87	6·93	5·27
Burns	*1·58*	*0·93*	*0·31*	*0·31*
Others and unspecified	*5·43*	*4·94*	*6·62*	*4·96*
TOTAL ADMISSIONS	100·00	100·00	100·00	100·00

TABLE 58

Relative Wastage Rates w.r.t. Major Diseases (weighted by duration of stay in hospital only) ; British Army ; Middle East ; 1943 and 1944

	Other Ranks		Officers	
	1943	1944	1943	1944
Tonsillitis and Pharyngitis	6·79	5·64	6·14	5·81
Bacillary Dysentery	6·17	5·39	6·96	4·40
Malaria	7·60	11·88	5·77	8·27
Sandfly Fever	3·31	1·24	4·57	1·67
P.U.O.	3·47	3·50	4·53	4·57
Infective Hepatitis	6·19	5·00	13·55	10·01
Urethritis (incl. Gonorrhoea)	3·21	2·80	1·27	0·96
Psychiatric Disorders	4·85	7·20	4·46	6·20
Impetigo	3·39	1·94	1·54	0·72
Bronchitis	2·75	2·60	1·84	1·81
Otitis Media and Externa	2·89	2·70	1·46	1·83
Common Cold	1·21	1·49	1·10	1·16
Scabies	1·12	0·54	0·48	0·26
Dyspepsia and Gastritis	1·57	1·45	1·90	2·50
Boils and Carbuncles	1·83	2·28	1·58	2·10
Dermatitis	2·49	2·71	1·34	1·40
Rheumatic conditions—non-articular	1·64	1·50	1·58	1·65
articular	0·46	0·38	0·41	0·39
Haemorrhoids	1·48	1·61	1·82	1·46
Diphtheria	3·64	1·98	3·06	2·51
Amoebiasis (incl. Amoebic Dysentery)	2·55	2·18	5·32	3·77
Appendicitis	1·63	1·63	1·74	2·37
Pneumonia	1·74	2·54	2·39	3·83
Hernia	2·00	2·34	1·43	1·98
Epidermophytosis	1·19	0·83	1·08	0·64
Syphilis	1·19	1·37	0·12	0·20
Others	23·67	25·28	22·61	27·51
TOTAL	100·00	100·00	100 00	100·00

TABLE 59

More Detailed Breakdown of Rates shown in Table 58

	Other Ranks		Officers	
	1943	1944	1943	1944
Bacillary Dysentery :				
Shiga	0·14	0·02	0·29	—
Flexner	0·39	0·09	0·49	0·16
Sonne	0·08	0·003	0·23	—
Unspecified	5·55	5·28	5·95	4·24
Malaria :				
B.T.	5·57	10·55	3·75	6·04
M.T.	1·08	0·65	1·06	1·24
Q.	0·03	0·01	—	0·05
Clinical	0·92	0·66	0·96	0·93
Blackwater Fever	0·01	0·01	—	—
Jaundice :				
Infective Hepatitis	6·19	5·00	13·55	10·01
Weil's Disease	0·00	—	0·07	—
Post-arsphenamine	0·19	0·43	—	—
Venereal Disease :				
Syphilis—early	0·67	0·94	0·07	0·14
late	0·06	0·06	0·05	—
congenital or unspec.	0·46	0·37	0·00	0·06
Urethritis—G.C.	2·60	1·81	1·11	0·50
non-specific and unspec.	0·61	0·99	0·16	0·46
Chancroid	0·12	0·41	0·08	0·05
Lymphogranuloma	0·02	0·01	—	—
Other	0·10	0·07	0·01	0·08

	Other Ranks		Officers	
	1943	1944	1943	1944
Psychiatric Disorders :				
Psychoses	1·10	1·47	1·38	1·69
Psychoneuroses	2·87	4·35	2·38	4·00
Psychopathic personality	0·47	0·82	0·59	0·38
Mental Deficiency	0·40	0·49	—	—
Other	0·02	0·07	0·11	0·12
Diphtheria :				
Faucial, laryngeal and nasal	1·55	1·06	1·66	1·64
Cutaneous	0·20	0·15	0·09	0·05
Unspecified and other	1·88	0·77	1·30	0·82
Amoebiasis :				
Amoebic Hepatitis and Tropical Abscess	0·36	0·30	0·88	0·56
Dysentery—Protozoal	2·03	1·66	3·84	2·35
Unspecified	0·16	0·21	0·59	0·86
Pneumonia :				
Primary Atypical	0·03	0·28	0·12	0·54
Lobar	1·01	1·32	1·50	1·87
Secondary (incl. Influenzal)	0·34	0·41	0·36	0·44
Unspecified	0·36	0·54	0·40	0·98
Epidermophytosis :				
Feet	0·76	0·51	0·94	0·49
Groin	0·12	0·08	0·08	0·00
Other	0·31	0·24	0·06	0·15

TABLE 60

Relative Wastage Rates w.r.t. Minor Diseases (weighted by duration of stay in hospital only) ; **British Army ; Middle East ; 1943 and 1944**

	Other Ranks		Officers	
	1943	1944	1943	1944
Varicose Veins	1·01	1·27	0·54	0·60
Neoplasms—all	0·91	1·08	0·52	0·84
Benign and unspecified	*0·78*	*0·85*	*0·30*	*0·62*
Malignant	*0·13*	*0·24*	*0·22*	*0·22*
Sinusitis	0·79	0·76	1·51	1·44
Conjunctivitis	0·68	0·81	0·27	0·22
I.D.K.	0·96	0·11	0·48	0·05
Synovitis and Arthritis	0·80	0·58	0·85	0·83
Keratitis	0·70	0·72	0·28	0·34
Influenza	0·29	0·26	0·46	0·26
Foot Deformities	0·55	0·40	0·03	0·22
Cystitis and Pyelitis	0·58	0·38	0·73	0·72
Peptic Ulcers—all	0·83	1·66	1·63	3·71
Gastric	*0·12*	*0·35*	*0·28*	*0·60*
Duodenal	*0·62*	*1·16*	*1·31*	*2·52*
Unspecified	*0·09*	*0·16*	*0·04*	*0·59*
Enteric Fever—all	0·92	0·75	0·96	1·08
Typhoid	*0·55*	*0·57*	*0·61*	*0·60*
Para. A.B.C.	*0·17*	*0·09*	*0·22*	*0·30*
Clinical	*0·20*	*0·08*	*0·13*	*0·18*
Rheumatic Fever	0·76	0·63	0·37	0·45
T.B.—all	1·63	2·29	2·42	3·86
Pulmonary	*1·48*	*2·18*	*2·32*	*3·40*
Other sites	*0·15*	*0·11*	*0·10*	*0·46*

	Other Ranks		Officers	
	1943	1944	1943	1944
Sciatica	0·49	0·77	0·72	0·96
Helminthiases—all	0·18	0·21	0·43	0·48
Schistosomiasis	*0·03*	*0·03*	*0·00*	*0·00*
Ankylostomiasis	*0·002*	*0·02*	—	—
Other	*0·15*	*0·17*	*0·43*	*0·48*
Leishmaniasis—all	0·39	0·16	0·20	0·02
Cutaneous	*0·33*	*0·10*	*0·20*	*0·02*
Visceral	*0·05*	*0·05*	—	—
Unspecified	*0·01*	*0·01*	—	—
Vincent's Angina	0·10	0·10	0·18	0·29
Rickettsiasis—all	0·27	0·06	0·18	0·07
Typhus—Unspecified	*0·23*	*0·05*	*0·15*	*0·07*
Murine	*0·04*	*0·01*	*0·03*	—
Trench fever	*0·001*	—	—	—
Nephritis	0·30	0·22	0·22	0·13
Heat Exhaustion	0·05	0·01	0·08	0·03
Heat Hyperpyrexia	0·003	0·002	0·00	—
Gingivitis	0·07	0·05	0·12	0·11
Effort Syndrome	0·07	0·06	0·10	0·10
Smallpox	0·07	0·31	0·14	0·29
Others	86·60	86·35	86·58	82·90
TOTAL	100·00	100·00	100·00	100·00

TABLE 61 **Relative Wastage Rates w.r.t. Specialist Diagnostic Groups (weighted by duration of stay in hospital only); British Army; Middle East; 1943 and 1944**

	Other Ranks		Officers	
	1943	1944	1943	1944
Diseases of Ear, Nose and Throat	11·96	10·35	9·95	10·22
Diseases of Skin	12·77	13·32	7·09	8·79
Psychiatric Disorders	4·85	7·20	4·46	6·20
Diseases of the Eye	2·00	2·21	1·02	0·79
Diseases of the Nervous System	1·97	2·09	2·23	2·29
Diseases of Mouth, Teeth and Gums	0·55	0·46	0·80	1·16
Other Diseases	65·90	64·37	74·45	70·55
All Diseases	100·00	100·00	100·00	100·00
ALL DISEASES	89·84	90·52	88·62	92·32
ALL INJURIES	10·16	9·48	11·38	7·68
Burns	*2·30*	*1·28*	*0·52*	*0·50*
Others and Unspecified	*7·86*	*8·20*	*10·86*	*7·18*
TOTAL ADMISSIONS	100·00	100·00	100·00	100·00

TABLE 62 **Relative Wastage Rates w.r.t. Major Diseases (weighted by duration of stay in hospital and convalescent depot); British Army Other Ranks; Middle East; 1943 and 1944**

	1943	1944
Tonsillitis and Pharyngitis	6·35	5·23
Bacillary Dysentery	5·75	4·92
Malaria	8·06	12·32
Sandfly Fever	3·07	1·49
P.U.O.	3·05	3·17
Infective Hepatitis	7·33	6·19
Urethritis (incl. Gonorrhoea)	2·51	1·67
Psychiatric Disorders	4·64	6·29
Impetigo	0·03	1·72
Bronchitis	3·10	2·59
Otitis Media and Externa	2·54	2·64
Common Cold	1·03	1·32
Scabies	0·92	0·47
Dyspepsia and Gastritis	1·38	1·34
Boils and Carbuncles	1·67	2·13
Dermatitis	2·15	2·51
Rheumatic Conditions—non-articular	1·58	1·53
articular	0·43	0·34
Haemorrhoids	1·45	1·64
Diphtheria	4·23	2·35
Amoebiasis (incl. Amoebic Dysentery)	2·42	1·93
Appendicitis	2·26	2·24
Pneumonia	2·04	3·07
Hernia	2·61	3·67
Epidermophytosis	1·02	0·78
Syphilis	0·93	1·19
Other Diseases	24·43	25·26
TOTAL	100·00	100·00
ALL DISEASES	89·50	90·10
ALL INJURIES	10·40	9·90
Burns	*2·30*	*1·20*
Others and Unspecified	*8·10*	*8·70*
TOTAL ADMISSIONS	100·00	100·00

TABLE 63

More Detailed Breakdown of Rates shown in Table 62

	1943	1944
Bacillary Dysentery:		
Shiga	0·13	0·02
Flexner	0·35	0·08
Sonne	0·07	0·004
Unspecified	5·20	4·82
Malaria:		
B.T.	6·01	10·99
M.T.	1·06	0·61
Q.	0·03	0·00
Clinical	0·97	0·69
Blackwater Fever	0·01	0·01
Jaundice:		
Infective Hepatitis	7·33	6·19
Weil's Disease	0·00	—
Post-arsphenamine	0·19	0·47
Venereal Disease:		
Syphilis—early	0·52	0·81
late	0·05	0·05
congenital or unspec.	0·36	0·33
Urethritis—G.C.	2·04	1·58
non-specific and unspecified	0·47	0·09
Chancroid	0·09	0·35
Lymphogranuloma	0·02	0·01
Other	0·08	0·06

	1943	1944
Psychiatric Disorders:		
Psychoses	0·91	1·25
Psychoneuroses	2·96	3·83
Psychopathic Personality	0·40	0·70
Mental Deficiency	0·34	0·43
Other	0·02	0·06
Diphtheria:		
Faucial, Laryngeal, Nasal	1·74	1·28
Cutaneous	0·20	0·16
Unspecified	2·27	0·89
Other	0·03	0·01
Amoebiasis:		
Amoebic Hepatitis and Tropical Abscess	0·34	0·03
Dysentery—Protozoal	1·93	1·68
Unspecified	0·15	0·21
Pneumonia:		
Primary Atypical	0·04	0·31
Lobar	1·20	1·61
Secondary (incl. Influenzal)	0·39	0·50
Unspecified	0·41	0·65
Epidermophytosis:		
Feet	0·63	0·49
Groin	0·11	0·07
Other	0·28	0·23

TABLE 64

Relative Wastage Rates w.r.t. Minor Diseases (weighted by duration of stay in hospital and convalescent depot); British Army Other Ranks; Middle East; 1943 and 1944

	1943	1944
Varicose Veins	1·23	1·26
Neoplasms—all	0·84	0·98
benign and unspec.	*0·73*	*0·78*
malignant	*0·11*	*0·20*
Sinusitis	0·73	0·72
Conjunctivitis	0·56	0·72
I.D.K.	1·02	0·15
Synovitis and Arthritis	0·79	0·61
Keratitis	0·57	0·64
Influenza	0·26	0·23
Foot Deformities	0·52	0·40
Cystitis and Pyelitis	0·55	0·34
Peptic Ulcer—all	0·73	1·44
Gastric	*0·12*	*0·30*
Duodenal	*0·54*	*1·00*
Unspecified	*0·07*	*0·13*
Enteric Fever—all	0·91	0·80
Typhoid	*0·53*	*0·60*
Para. A, B, C	*0·18*	*0·11*
Clinical	*0·20*	*0·08*
Rheumatic Fever	0·77	0·66
T.B.—all	1·50	2·15
Pulmonary	*1·36*	*2·05*
Other Sites	*0·14*	*0·09*

	1943	1944
Sciatica	0·49	0·75
Helminthiasis—all	0·17	0·19
Schistosomiasis	*0·02*	*0·02*
Ankylostomiasis	*0·00*	*0·02*
Other	*0·14*	*0·15*
Leishmaniasis—all	0·37	0·14
Cutaneous	*0·32*	*0·09*
Visceral	*0·03*	*0·04*
Unspecified	*0·01*	*0·01*
Vincent's Angina	0·08	0·08
Rickettsiasis—all	0·29	0·07
Typhus—Unspecified	*0·24*	*0·05*
Murine	*0·05*	*0·01*
Trench Fever	*0·00*	—
Nephritis	0·27	0·20
Heat Exhaustion	0·04	0·01
Heat Hyperpyrexia	0·002	0·002
Gingivitis	0·06	0·04
Effort Syndrome	0·07	0·05
Smallpox	0·06	0·31
Others	86·46	87·72
TOTAL	100·00	100·00

TABLE 65

Average Duration of Stay (Days) in hospital and convalescent depot w.r.t. Major Diseases; British Army Other Ranks; Middle East; 1943 and 1944

	1943		1944	
	Hosp. only	Hosp. + Con. Depot	Hosp. only	Hosp. + Con. Depot
Tonsillitis and Pharyngitis	11·9	14·3	11·8	13·0
Bacillary Dysentery	14·2	17·0	14·4	15·5
Malaria	17·9	24·4	16·8	20·6
Sandfly Fever	8·9	10·6	8·4	12·0
P.U.O.	10·4	11·8	10·5	11·3
Infective Hepatitis	26·2	40·0	30·2	44·4
Urethritis (incl. Gonorrhoea)	19·1	19·2	23·1	23·8
Psychiatric Disorders	29·3	36·0	41·6	43·0
Impetigo	20·5	23·5	22·5	23·7
Bronchitis	17·0	24·6	16·9	19·9
Otitis Media and Externa	19·0	24·5	21·7	28·2
Common Cold	9·3	10·2	9·7	10·2
Scabies	9·9	10·5	11·1	11·6
Dyspepsia and Gastritis	17·5	19·8	17·6	19·3
Boils and Carbuncles	20·6	24·3	22·5	25·0
Dermatitis	28·7	32·0	33·6	36·9
Rheumatic Conditions—non-articular	19·5	24·3	20·3	24·6
articular	32·5	39·4	35·8	38·6
Haemorrhoids	18·5	23·3	23·0	27·9
Diphtheria	49·1	73·3	49·8	70·3
Amoebiasis (incl. Amoebic Dysentery)	38·2	54·6	41·0	48·9
Appendicitis	25·6	45·6	28·1	46·0
Pneumonia	28·6	42·2	31·8	45·4
Hernia	35·2	59·2	38·2	70·9
Epidermophytosis	23·0	25·4	28·2	31·3
Syphilis	23·6	24·0	24·3	25·0
ALL DISEASES	19·2	24·7	21·2	25·3
ALL INJURIES	28·8	38·3	35·6	44·2
Injuries (excl. Burns)	*28·8*	*38·4*	*36·6*	*46·3*
Burns	*28·9*	*37·7*	*30·4*	*33·3*

TABLE 66

Average Duration of Stay (Days) in hospital and convalescent depot w.r.t. Major Diseases (by type); British Army Other Ranks; Middle East; 1943 and 1944

	1943		1944	
	Hosp. only	Hosp. + Con. Dep.	Hosp. only	Hosp. + Con. Dep.
Bacillary Dysentery:				
Shiga	21·4	25·4	22·5	25·0
Flexner	14·2	16·6	21·7	23·4
Sonne	13·8	16·6	13·0	19·7
Unspecified	14·0	16·8	14·2	15·4
Malaria:				
B.T.	17·2	23·9	16·4	20·3
M.T.	20·2	25·5	18·5	20·5
Q.	15·9	24·4	19·0	19·0
Clinical	19·5	26·4	20·1	25·3
Blackwater Fever	46·3	54·3	105·0	105·0
Jaundice:				
Infective Hepatitis	26·2	40·0	30·2	44·4
Weil's Disease	8·0	8·0	—	—
Post-arsphenamine	40·2	51·6	41·0	54·8
Venereal Disease:				
Syphilis—early	22·3	22·4	23·2	23·6
late	54·8	59·4	39·1	39·1
congenital or unspec.	23·8	24·4	25·7	27·5
Urethritis—G.C.	19·7	19·9	23·3	24·1
non-specific and unspec.	16·5	16·6	19·8	19·9
Chancroid	18·1	18·3	17·5	17·7
Lymphogranuloma	19·7	21·0	12·5	12·5
Other	12·5	12·7	24·9	24·9

	1943		1944	
	Hosp. only	Hosp. + Con. Dep.	Hosp. only	Hosp. + Con. Dep.
Psychiatric Disorders:				
Psychoses	68·6	72·7	70·9	72·0
Psychoneuroses	22·4	29·7	34·8	36·4
Psychopathic Personality	39·1	43·0	52·7	53·4
Mental Deficiency	43·6	47·7	45·5	46·5
Other	36·0	41·5	57·5	57·5
Diphtheria:				
Faucial, Laryngeal and Nasal	52·7	75·9	48·9	70·7
Cutaneous	68·0	84·4	65·5	85·2
Unspecified	45·1	70·7	48·5	67·5
Other	43·1	78·1	51·0	66·3
Amoebiasis:				
Amoebic Hepatitis and Tropical Abscess	47·1	57·2	83·8	92·6
Dysentery Protozoal	37·1	45·2	39·3	47·3
Unspecified	35·6	43·5	53·5	61·2
Pneumonia:				
Primary Atypical	20·8	33·0	36·0	48·0
Lobar	30·8	47·4	32·0	46·1
Secondary (incl. Influenzal)	24·9	36·6	29·4	42·5
Unspecified	27·4	40·2	31·1	44·7
Epidermophytosis:				
Feet	23·9	25·7	29·4	33·0
Groin	17·8	21·5	16·3	16·9
Other	23·4	26·9	32·7	36·5

TABLE 67

Average Duration of Stay (Days) in hospital and convalescent depot w.r.t. Minor Diseases; British Army Other Ranks; Middle East; 1943 and 1944

	1943		1944	
	Hosp. only	Hosp. + Con. Dep.	Hosp. only	Hosp. + Con. Dep.
Varicose Veins	21·4	33·5	23·2	27·2
Neoplasms—all	19·5	23·0	22·6	24·4
benign and unspec.	*18·1*	*21·7*	*19·5*	*21·4*
malignant	*35·0*	*37·2*	*51·4*	*53·3*
Sinusitis	19·1	23·0	19·9	22·5
Conjunctivitis	17·6	18·6	23·6	22·5
I.D.K.	32·5	44·1	35·3	53·7
Synovitis and Arthritis	29·1	36·6	39·8	49·5
Keratitis	26·5	27·9	31·1	32·9
Influenza	12·6	14·2	12·1	12·8
Foot Deformities	24·1	29·5	34·4	41·1
Cystitis and Pyelitis	25·9	31·6	24·7	27·1
Peptic Ulcer—all	49·9	56·1	59·9	61·5
Gastric	*42·2*	*49·7*	*60·9*	*63·1*
Duodenal	*51·3*	*57·6*	*59·0*	*60·6*
Unspec.	*52·6*	*56·6*	*63·5*	*63·9*
Enteric Fever—all	62·6	79·1	67·1	84·7
Typhoid	*67·8*	*82·7*	*70·8*	*88·2*
Para. A, B, C	*57·7*	*80·9*	*69·3*	*93·7*
Clinical	*54·8*	*69·9*	*47·5*	*60·5*
Rheumatic Fever	54·9	71·4	59·2	73·3
T.B.—all	120·3	141·8	125·2	138·7
Pulmonary	*133·2*	*156·3*	*130·0*	*144·8*
Other sites	*60·4*	*74·0*	*71·9*	*71·9*
Sciatica	36·5	47·0	43·0	49·6
Helminthiasis—all	13·5	15·9	14·8	15·4
Schistosomiasis	*41·5*	*52·1*	*40·6*	*48·2*
Ankylostomiasis	*14·5*	*21·0*	*33·1*	*35·5*
Other	*11·9*	*13·8*	*13·0*	*13·3*
Leishmaniasis—all	29·8	37·4	49·5	53·5
Cutaneous	*26·5*	*34·2*	*38·4*	*41·5*
Visceral	*140·3*	*144·4*	*139·0*	*145·3*
Unspec.	*48·0*	*56·0*	*48·5*	*61·0*
Vincent's Angina	13·9	14·9	12·9	13·1
Rickettsiasis—all	40·0	55·3	39·6	54·9
Typhus—unspec.	*42·4*	*56·8*	*40·9*	*57·4*
Murine	*31·4*	*51·2*	*34·7*	*46·2*
Trench Fever	*13·0*	*13·0*	—	—
Nephritis	48·6	59·0	48·6	53·0
Heat Exhaustion	8·0	10·4	9·4	10·8
Heat Hyperpyrexia	8·8	8·8	9·0	9·0
Gingivitis	12·7	14·7	14·1	14·7
Effort Syndrome	14·4	19·6	17·6	20·0
Smallpox	27·3	30·8	39·6	47·0

TABLE 68 **Relative Mortality and Fatality Rates and Absolute Fatality Rates per 1,000 Cases ; British Army Other Ranks ; Middle East ; 1943 and 1944**

	1943			1944		
	Rel. Mortality	Abs. Fatality	Rel. Fatality	Rel. Mortality	Abs. Fatality	Rel. Fatality
Injuries (excl. Burns)	31·02	17·64	0·91	33·11	17·15	1·09
Burns	7·92	15·42	0·79	5·30	14·55	0·93
Enteric Fever	6·64	77·78	4·00	6·62	76·34	4·87
Rickettsiases	6·33	161·29	8·30	—	—	—
Neoplasms	6·01	22·25	1·14	5·30	14·16	0·90
Poliomyelitis	5·70	236·84	12·18	7·28	343·75	21·93
Diseases of nervous system	4·43	11·39	0·59	5·96	12·86	0·82
Smallpox	4·11	270·83	13·93	2·65	43·48	2·77
Pneumonia	3·80	10·75	0·55	5·30	8·47	0·54
Malaria	2·85	1·16	0·06	2·65	0·48	0·03
Diphtheria	2·85	6·63	0·34	1·99	6·41	0·41
Infective Hepatitis	2·53	1·84	0·09	5·96	4·62	0·29
Tuberculosis	2·53	32·26	1·66	4·64	32·41	2·07
Amoebiasis (incl. Amoebic Dysentery)	2·21	5·71	0·29	0·66	1·59	0·10
Appendicitis	1·58	4·28	0·22	1·99	4·41	0·28
Nephritis	1·27	36·04	1·85	1·99	56·60	3·61
Post-arsphenamine Jaundice	0·95	34·88	1·79	—	—	—
Bacillary Dysentery	0·63	0·25	0·01	0·66	0·23	0·01
Meningococcal infection	0·63	125·00	6·43	0·66	166·67	10·64
Psychosis	0·63	6·83	0·35	—	—	—
Otitis Media	0·63	1·11	0·06	0·66	1·11	0·07
Bacterial Endocarditis	0·63	666·67	34·29	1·99	750·00	47·86
Peptic Ulcer	0·63	6·56	0·34	1·99	10·03	0·64
Syphilis	0·32	1·08	0·06	0·66	1·50	0·10
Chancroid	0·32	8·62	0·44	—	—	—
P.U.O.	0·32	0·17	0·01	—	—	—
Tonsillitis and Pharyngitis	0·32	0·10	0·01	1·32	0·36	0·02
Hernia	0·32	0·97	0·05	—	—	—
Heat Exhaustion	0·32	9·17	0·47	—	—	—
Heat Hyperpyrexia	0·32	166·67	8·57	—	—	—
Rheumatic Fever	0·32	3·95	0·20	—	—	—
Others	0·95	....	....	0·66	....	....
TOTAL	100·00	....	100·00	100·00	....	100·00

TABLE 69—Seasonal Distributions of Hospital Admissions in the Middle East; British Army Other Ranks; 1943

	Jan.	Feb.	Mar.	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total	Sample Size	C. of V.
Amoebiasis (incl. Amoebic Dysentery)	7·16	8·50	6·16	6·48	7·13	5·61	6·32	7·63	9·90	12·79	12·45	9·87	100·00	1,225	28·0
Bacillary Dysentery—Shiga	11·84	6·37	4·70	14·45	28·10	14·32	2·57	2·77	8·34	3·64	2·90	—	100·00	119	89·9
Flexner	4·61	6·17	5·55	17·43	36·30	24·22	1·73	0·94	2·38	0·31	0·37	—	100·00	501	131·1
All	1·20	0·90	0·83	3·21	8·92	9·05	10·27	12·90	14·54	15·10	15·43	7·65	100·00	7,939	64·8
Malaria—B.T.	0·78	0·57	1·04	1·92	4·07	7·40	14·77	18·39	16·60	19·39	9·80	5·27	100·00	5,898	83·2
M.T.	2·55	1·89	0·66	2·07	3·42	4·56	5·67	10·17	13·71	20·58	20·82	13·92	100·00	976	84·2
All	1·11	0·65	1·05	2·09	3·98	6·74	13·25	18·23	16·57	19·47	10·68	6·17	100·00	7,753	81·3
Sandfly Fever	0·19	0·12	0·11	0·97	6·01	13·05	19·00	20·76	18·52	14·25	5·96	1·06	100·00	6,796	93·6
P.U.O.	1·01	0·67	0·94	3·11	6·22	6·18	15·64	19·29	21·35	15·63	6·60	3·37	100·00	6,058	86·8
Infective Hepatitis	27·86	10·28	4·00	3·70	2·42	1·72	2·88	4·27	7·10	9·70	13·68	12·39	100·00	4,308	84·9
Conjunctivitis	8·46	9·19	5·95	11·78	7·13	9·17	11·87	8·16	7·62	7·93	8·61	4·13	100·00	703	25·0
Keratitis	7·79	8·36	7·73	7·65	8·53	7·11	9·02	9·94	9·84	5·85	9·86	8·33	100·00	479	14·4
Common Cold	7·36	11·53	9·07	13·10	6·37	6·12	8·30	6·98	6·44	5·01	7·73	11·98	100·00	2,356	29·8
Tonsillitis and Pharyngitis	6·70	7·67	5·64	6·83	6·06	8·07	9·72	9·08	9·02	9·90	11·20	10·10	100·00	10,438	20·5
Sinusitis	7·00	5·62	4·37	5·70	5·63	7·04	13·64	16·00	11·66	10·32	8·10	4·92	100·00	749	43·1
Otitis Media	4·70	6·11	4·45	5·55	6·86	7·57	15·87	15·11	12·74	8·92	7·75	4·37	100·00	2,787	45·6
Pneumonia	6·42	7·97	10·36	10·45	7·27	6·31	10·53	10·30	8·25	4·85	7·73	9·55	100·00	1,116	22·1
Bronchitis	6·71	8·10	7·56	8·96	6·20	6·98	10·83	9·55	9·89	8·49	8·31	8·39	100·00	2,952	15·6
Diphtheria	20·56	17·11	8·59	7·34	3·64	2·60	2·96	4·44	7·08	6·58	8·23	10·87	100·00	819	62·5
Boils and Carbuncles	6·63	8·88	6·82	10·22	8·34	5·73	12·15	8·71	7·39	8·27	8·39	8·46	100·00	1,617	19·6
Impetigo	6·46	7·48	6·66	9·60	7·67	6·98	9·45	10·12	8·55	8·35	11·44	7·24	100·00	3,024	18·0
Dermatitis	7·44	9·48	6·95	8·88	7·34	5·81	8·56	8·52	7·92	7·86	9·87	11·35	100·00	1,585	16·9
Appendicitis	6·71	8·77	7·55	8·66	10·55	6·51	10·13	9·50	7·78	7·50	8·97	7·40	100·00	1,167	15·4
Dyspepsia and Gastritis	7·16	7·35	7·13	8·69	8·49	9·96	10·44	9·87	8·54	8·26	7·78	6·31	100·00	1,634	14·8
Haemorrhoids	5·23	6·08	4·83	8·79	10·60	8·38	10·91	8·16	10·11	8·27	9·78	8·86	100·00	1,465	23·3
Psychoses	3·41	5·04	3·46	6·07	6·13	10·24	7·84	8·49	4·97	10·65	14·79	18·91	100·00	293	52·9
Psychoneuroses	5·08	5·05	4·61	15·90	11·31	5·49	8·40	10·10	6·43	6·70	10·50	10·43	100·00	2,341	39·3
Scabies	12·28	10·02	8·59	13·19	9·07	8·66	6·14	6·57	4·85	5·00	8·33	7·30	100·00	2,061	30·1
Early Syphilis	10·85	8·61	7·39	7·55	6·81	5·69	9·72	9·61	8·48	7·10	7·95	10·24	100·00	551	17·9
Urethritis G.C.	10·04	8·58	9·64	10·07	10·74	12·10	10·16	8·94	4·64	4·32	5·64	5·15	100·00	2,408	30·9
Chancroid	9·65	5·72	4·33	4·59	3·24	11·50	14·62	11·61	5·63	14·16	5·20	9·74	100·00	116	46·2

§2 MEDICAL WASTAGE OF DIFFERENT ARMS OF THE SERVICE; M.E.F. 1943-44

THE initial section of Part III deals with medical wastage in the Middle East without regard to relative morbidity risks of different arms of the Service. To eliminate variables capable of distorting the picture disclosed by data with respect to hospital admissions would necessitate standardization of all figures for age, locality and length of service overseas. Unfortunately, we have not at our disposal the requisite data to do this. Consequently, we cannot ascertain to what extent differentials exhibited in the ensuing tables (70-72) are due to one or another difference in the composition of the various arms of Service. None the less, crude figures have administrative uses, in so far as army organization prescribes that arms of Service will be subject to similar differences w.r.t. risk of disease in different campaigns. In any assessment of morbidity differentials we have to take into consideration possible effects of administrative policy with respect to standards of fitness and of education necessary for the type of work performed by each corps, in addition to the variables mentioned above. For example, men with locomotor defects are more likely to be found in a sedentary job in the R.A.P.C. than on the barrack square with a Guards regiment. Hence it is necessary to exercise caution in deciding whether a high incidence of a disease in one arm of Service implies that conditions in that arm are conducive to the risk of incurring it.

Relevant data which refer to other ranks only are presented in two ways. Table 70 and Chart 14 show for each disease its incidence in one arm as a percentage of the sum of such rates for all arms. The last column gives the Coefficient of Variation as an indication of the extent to which the incidence of a disease varies with arm of Service. A C. of V. of less than 35 indicates that its incidence is about the same in most arms of Service. A C. of V. of more than 50 indicates considerable differences. Diseases with a C. of V. of less than 35, 35 to 50 and over 50 are shown in Table 73. Diseases within each group of C. of V. values are arranged in three blocks. The top block contains diseases which fell into the same group each year. The middle and bottom blocks contain diseases whose Coefficients of Variation placed them respectively in higher or lower groups in 1944 than in 1943. For example, the C. of V. with respect to *Burns* rose from 37·2 in 1943 to 54·4 in 1944 whereas the C. of V. with respect to *Syphilis* fell from 67·1 to 42·6. The majority of diseases had similar Coefficients of Variation in both years. Those showing the highest variation were the *Peptic Ulcers*, *Malaria* and *I.D.K.*

Although the Coefficient of Variation is indicative of the overall extent of variation w.r.t. morbidity in different arms of the Service, a low value may conceal an outstanding differential involving only one regiment or corps. To bring into clearer perspective such differentials, Tables 71 and 72 show for each arm of Service the proportionate contribution of each of the principal diseases and injuries to their sum total of admissions to hospital. Only a few arms, notably R.A.P.C. and R.A.M.C., fail to conform with the picture presented by the whole force, and the relevant differentials are shown in Table 74. Since we have only a small sample with respect to some diseases, this table shows only those differentials which were evident both in 1943 and in 1944.

As we might expect, *Pay Corps* personnel working at rather closer quarters than more active troops experience a relatively high incidence of the droplet infections, *Common Cold* and *Tonsillitis*. In 1944 the latter was responsible for as much as 17% of admissions to hospital for diseases listed. That *Infective Hepatitis* should also be high among Pay Corps personnel is, of course, consistent with a different mode of transmission. That the R.A.P.C. live in relatively comfortable conditions at base, comparatively free from infected dust and water offers an explanation for a correspondingly low incidence of *Otitis Media*, *Conjunctivitis* and *Skin conditions*. The sedentary nature of their work shows itself in a low rate of *I.D.K.*, *Injuries* and *Burns*. The very high incidence of *Varicose Veins* is almost certainly due to a tendency to post men suffering from that complaint to a clerical job, and the complete absence of *Psychoses* is presumably explicable on opposite terms.

The R.A.M.C. with living conditions most akin to those of the R.A.P.C. also have a relatively high incidence of *Common Cold* and a relatively low incidence of *Conjunctivitis* and *Injuries*. High *Sandfly Fever* figures for both Corps may signify less w.r.t. the incidence of the disease than to the prospects of a sound diagnosis, that is to say, both have access to clinical facilities not always available to forward units. Differentials disclosed with respect to *Gonorrhoea* and *Syphilis* may serve to indicate the educational level demanded by more or less technical corps.

There is no general pattern running through differentials affecting other arms of Service. A high rate of *Conjunctivitis* in the R.A.O.C. apparently represents an occupational hazard since men of that corps are continuously exposed to dust and to particles of metal. The relatively high incidence of *Psychoneuroses* among Infantrymen may be a result of battle-stress particularly as the incidence was higher in 1943 when the Middle East was still an active theatre of war. Perhaps the most interesting single differential is that affecting the R.A.C. *viz*.: a high incidence of *Gastric Ulcers*, the ratio of *Gastric* to *Duodenal* being just over 1 : 1 as opposed to about 1 : 4 in the whole Force. Since we have some reason to expect R.A.C. personnel to have a rather younger age composition than less operational troops, this differential is more likely to be reinforced than diminished by age standardization.

Other than a few differentials which might be described as occupational hazards, such as a high incidence of *Gastric Ulcer* in the R.A.C., of *Conjunctivitis* in the R.A.O.C. and of *Psychoneuroses* among the infantry, differences w.r.t. morbidity in different arms of the Service appear to be due mainly to differences in the working and living environment. Troops working closely together under relatively normal conditions at base have a high incidence of diseases transmitted by droplet infection. If we remove them from these conditions and put them in forward units where they are living in the open, the incidence of droplet infections goes down but they become more prone to diseases transmitted by dust and water and to injuries, regardless of whether active warfare prevails or not.

TABLE 70

Relative Incidence of Admissions to Hospital in M.E.F. by Arms of Service; British Army Other Ranks; 1943 and 1944

		INFANTRY	R.A.C.	R.A.	R.E.	R. SIGS	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.	OTHERS	TOTAL	SAMPLE SIZE	C. of V.
MALARIA	1943	7·40	5·76	7·73	7·65	5·29	5·40	5·99	5·80	2·04	23·13	9·14	14·68	100·00	7,765	62·4
	1944	20·18	13·54	9·17	6·52	6·55	6·05	8·33	5·11	0·72	9·47	8·33	6·03	100·00	8,352	54·1
BACILLARY DYSENTERY	1943	7·40	7·10	7·75	6·93	8·51	5·16	10·65	9·45	8·23	11·86	9·37	7·58	100·00	7,939	20·7
	1944	9·50	6·18	7·82	7·18	6·63	7·08	11·87	8·72	10·78	7·00	9·41	7·84	100·00	4,423	20·4
AMOEBIASIS	1943	6·64	5·15	7·02	7·90	5·65	5·00	14·42	7·67	14·19	7·49	7·21	11·64	100·00	1,226	38·1
	1944	11·09	5·66	8·91	7·76	6·93	8·31	11·32	5·07	12·87	8·59	6·86	6·67	100·00	627	27·7
INFECTIVE HEPATITIS	1943	10·67	7·67	7·87	7·62	8·42	6·32	8·21	6·89	11·07	8·47	5·65	11·14	100·00	4,303	20·8
	1944	12·28	8·48	8·42	7·22	8·46	7·14	7·18	6·05	14·98	5·15	7·03	7·61	100·00	1,953	31·5
SANDFLY FEVER	1943	3·89	8·34	8·95	7·33	8·16	6·30	15·99	7·64	10·43	5·22	7·24	10·50	100·00	6,796	35·4
	1944	8·30	6·12	7·77	7·18	6·53	7·97	13·56	7·02	16·32	5·99	5·07	8·15	100·00	1,731	37·8
P.U.O.	1943	4·20	15·21	5·62	6·52	7·17	5·82	12·60	7·37	4·00	11·78	5·99	13·72	100·00	6,058	44·9
	1944	10·46	7·53	7·81	6·77	7·42	7·49	13·98	7·52	6·52	7·63	7·40	9·46	100·00	3,921	42·3
DIPHTHERIA	1943	13·31	7·35	8·00	7·38	6·10	5·76	9·10	9·73	5·93	6·49	11·24	9·60	100·00	1,361	28·2
	1944	16·99	10·08	11·08	6·44	5·09	5·42	11·48	8·11	6·01	5·34	8·67	5·28	100·00	464	39·6
OTITIS MEDIA	1943	8·03	7·94	9·75	10·26	8·06	6·20	8·77	6·48	4·35	12·24	8·17	9·74	100·00	1,806	24·0
	1944	14·23	11·20	9·54	10·25	9·66	6·72	9·84	7·01	4·92	4·38	7·85	4·41	100·00	901	34·7
OTITIS EXTERNA	1943	8·25	8·01	10·88	9·20	10·09	5·44	11·07	7·02	8·17	6·38	8·44	7·06	100·00	986	20·4
	1944	12·78	7·63	8·48	7·02	7·40	8·99	11·11	7·44	7·64	5·66	10·44	5·41	100·00	563	25·2
SINUSITIS	1943	6·40	7·69	6·91	7·18	7·98	4·49	16·47	5·70	17·36	5·43	8·53	5·86	100·00	749	46·5
	1944	13·07	7·75	7·83	8·14	8·95	6·71	16·81	6·93	6·16	2·74	10·77	4·14	100·00	451	43·8
TONSILLITIS and PHARYNGITIS	1943	7·71	7·92	8·17	8·84	6·45	6·30	11·04	8·06	12·35	6·45	7·38	9·35	100·00	10,438	21·5
	1944	11·33	6·81	8·42	7·16	6·96	7·09	10·73	7·93	13·16	4·91	7·05	8·41	100·00	5,605	26·5

TABLE 70 (*contd.*)

Relative Incidence of Admissions to Hospital in M.E.F. by Arms of Service; British Army Other Ranks; 1943 and 1944

		INFANTRY	R.A.C.	R.A.	R.E.	R. SIGS	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.	OTHERS	TOTAL	SAMPLE SIZE	C. of V.
COMMON COLD	1943	7·69	5·60	6·10	6·95	6·26	4·70	20·34	6·61	11·80	8·94	6·69	8·31	100·00	2,356	48·4
	1944	8·90	6·02	7·09	7·13	6·89	7·76	16·28	7·51	11·70	6·74	7·48	6·48	100·00	1,807	33·5
INFLUENZA	1943	7·10	6·42	5·67	10·72	11·70	3·52	11·82	5·95	10·47	7·37	6·20	13·15	100·00	419	35·7
	1944	6·63	3·71	12·00	9·86	12·49	11·39	7·52	9·04	6·19	5·50	7·99	7·68	100·00	253	31·2
PNEUMONIA	1943	5·90	6·70	5·90	7·09	7·35	5·81	9·93	8·05	14·90	11·35	7·66	9·37	100·00	1,115	33·1
	1944	11·35	8·88	8·87	7·81	8·62	8·97	12·14	7·67	8·89	4·61	6·98	5·21	100·00	944	25·0
BRONCHITIS	1943	6·36	5·67	5·50	7·21	5·21	5·44	11·93	9·21	11·57	15·00	7·19	9·70	100·00	2,951	36·5
	1944	10·39	5·11	7·56	6·64	6·13	8·39	16·43	8·53	5·78	9·32	7·19	8·52	100·00	1,813	34·2
CONJUNCTIVITIS	1943	10·32	9·86	9·24	11·31	5·12	8·82	—	14·13	—	9·71	11·79	9·73	100·00	703	36·3
	1944	12·55	9·69	8·84	8·86	7·72	8·43	—	16·95	3·68	8·18	9·78	5·33	100·00	404	45·9
KERATITIS	1943	7·44	7·33	6·97	8·36	5·76	5·70	9·19	11·02	4·84	15·90	10·83	6·67	100·00	479	35·4
	1944	13·12	3·95	9·90	9·43	5·32	10·53	10·99	5·56	5·49	9·77	12·52	3·41	100·00	273	39·0
IMPETIGO	1943	11·44	8·31	9·92	7·82	5·80	6·46	8·31	6·17	8·84	10·78	7·55	8·60	100·00	3,024	20·4
	1944	16·35	8·82	9·01	7·54	5·60	6·75	7·72	6·68	2·83	11·33	7·42	9·96	100·00	1,014	38·4
DERMATITIS	1943	7·91	7·78	8·83	8·65	5·61	6·44	9·95	7·40	6·29	13·29	8·80	9·05	100·00	1,585	23·3
	1944	11·59	6·29	10·50	10·69	7·10	7·83	12·64	7·99	3·09	8·24	6·22	7·82	100·00	949	30·7
BOILS and CARBUNCLES	1943	7·70	7·95	7·42	7·42	5·26	6·60	15·55	7·12	1·50	13·34	8·52	11·64	100·00	1,618	42·7
	1944	10·38	8·26	10·56	8·38	6·24	7·60	14·93	7·76	4·76	7·40	6·86	6·89	100·00	1,189	30·4
SCABIES	1943	14·07	7·69	9·38	9·59	6·53	5·76	7·23	6·58	6·67	10·86	5·36	10·27	100·00	2,058	29·5
	1944	15·05	9·32	7·54	8·92	7·09	7·74	11·87	3·95	2·51	6·70	8·39	10·91	100·00	572	37·5
GONORRHOEA	1943	10·34	10·47	7·94	7·59	4·83	6·35	6·71	5·47	3·14	15·69	5·72	15·75	100·00	2,408	46·5
	1944	18·93	7·44	7·13	9·68	5·40	9·27	4·63	4·83	4·92	12·03	5·68	10·05	100·00	914	47·4

DERMATITIS	1943 1944	7·91 11·59	7·78 6·29	8·83 10·50	8·65 10·69	5·61 7·10	6·44 7·83	9·95 12·64	7·40 7·99	6·29 3·09	13·29 8·24	8·80 6·22	9·05 7·82	100·00 100·00	1,585 949	23·3 30·7
BOILS and CARBUNCLES	1943 1944	7·70 10·38	7·95 8·26	7·42 10·56	7·42 8·38	5·26 6·24	6·60 7·60	15·55 14·93	7·12 7·76	1·50 4·76	13·34 7·40	8·52 6·86	11·64 6·89	100·00 100·00	1,618 1,189	42·7 30·4
SCABIES	1943 1944	14·07 15·05	7·69 9·32	9·38 7·54	9·59 8·92	6·53 7·09	5·76 7·74	7·23 11·87	6·58 3·95	6·67 2·51	10·86 6·70	5·36 8·39	10·27 10·91	100·00 100·00	2,058 572	29·5 37·5

§2 (*contd.*) MEDICAL WASTAGE OF DIFFERENT ARMS OF THE SERVICE; M.E.F. 1943 AND 1944

TABLE 70 (*contd.*) Relative Incidence of Admissions to Hospital in M.E.F. by Arms of Service; British Army Other Ranks; 1943 and 1944

		INFANTRY	R.A.C.	R.A.	R.E.	R. SIGS	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.	OTHERS	TOTAL	SAMPLE SIZE	C. of V.
EARLY SYPHILIS	1943	7·83	7·07	8·32	7·72	4·00	7·42	5·07	4·25	—	19·72	8·55	20·06	100·00	527	67·1
	1944	15·76	8·33	9·99	11·48	3·17	8·32	5·50	5·10	3·02	10·75	8·26	10·32	100·00	502	42·6
GASTRIC ULCER	1943	6·25	32·97	—	1·61	12·79	8·37	20·25	—	—	—	6·84	10·90	100·00	53	115·2
	1944	8·87	33·69	—	10·13	6·68	6·22	9·03	7·44	—	7·35	3·77	6·85	100·00	68	99·2
DUODENAL ULCER	1943	4·98	6·12	5·27	7·17	4·35	6·21	11·27	6·94	33·26	3·90	3·80	6·74	100·00	221	92·4
	1944	7·45	8·21	7·63	5·81	7·66	8·12	16·29	4·15	—	21·08	3·20	10·36	100·00	232	63·7
DYSPEPSIA and GASTRITIS	1943	6·68	5·77	6·31	7·18	5·45	6·67	17·28	4·44	11·99	10·00	7·92	10·31	100·00	1,638	40·1
	1944	11·43	6·65	7·85	8·67	5·71	8·24	13·63	5·77	6·94	9·26	7·80	8·04	100·00	968	26·3
HAEMORRHOIDS	1943	8·19	7·01	8·89	7·91	7·50	7·05	8·45	6·44	5·20	13·82	9·86	9·69	100·00	1,465	25·2
	1944	11·33	4·83	9·21	8·31	6·12	7·34	9·98	4·54	12·91	9·33	7·60	8·51	100·00	823	28·7
APPENDICITIS	1943	8·35	8·21	8·43	6·76	8·23	6·39	11·78	6·00	6·41	10·03	8·15	11·26	100·00	1,167	21·7
	1944	14·08	6·54	8·66	6·31	8·48	7·08	9·92	9·09	12·12	3·57	7·21	6·90	100·00	680	32·1
HERNIA	1943	6·86	6·00	8·73	7·78	5·72	8·49	13·26	6·93	4·81	13·75	8·68	8·97	100·00	1,036	31·7
	1944	9·18	6·96	11·77	4·91	6·15	9·41	12·39	8·34	10·02	3·56	9·44	7·88	100·00	721	30·3
I.D.K.	1943	15·56	11·60	11·62	9·35	6·18	5·52	10·15	5·38	—	—	11·72	12·93	100·00	542	57·1
	1944	13·28	20·40	3·72	6·26	10·99	10·24	6·20	7·66	—	15·14	2·59	3·52	100·00	38	67·9
PSYCHOSES	1943	8·68	5·20	5·13	5·34	7·06	6·60	8·31	8·04	—	33·17	6·83	5·73	100·00	293	39·6
	1944	12·32	6·99	10·97	8·73	7·84	10·47	10·61	8·74	—	5·76	8·86	8·71	100·00	244	36·7
PSYCHO-NEUROSES	1943	16·26	6·89	7·03	7·66	6·10	6·17	7·36	5·84	10·05	11·52	6·07	9·04	100·00	2,341	35·2
	1944	13·96	5·90	6·91	6·51	5·82	8·26	7·19	6·22	14·94	9·38	8·28	6·64	100·00	1,469	30·6
INJURIES—N.E.A. (excl. burns)	1943	8·38	8·28	7·88	9·23	6·97	7·19	6·24	7·98	5·09	8·50	7·33	16·92	100·00	4,522	33·7
	1944	10·83	8·06	9·08	10·53	7·08	7·91	8·25	6·76	5·61	7·71	7·47	10·71	100·00	2,790	19·2
BURNS—N.E.A.	1943	7·53	8·49	9·16	7·66	7·56	8·00	13·06	4·38	1·81	9·32	9·27	13·76	100·00	1,470	37·2
	1944	10·92	11·11	11·57	7·18	5·82	7·16	13·58	2·90	—	4·58	8·41	16·78	100·00	548	54·4

TABLE 71

Relative Casualty Rates by Arms of Service—M.E.F.; British Army Other Ranks; 1943

	Total	Infantry	R.A.C.	R.A.	R.E.	R. Sigs.	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.
Tonsillitis and Pharyngitis	11·62	11·00	11·32	12·01	12·97	10·98	12·01	11·81	13·05	15·54	6·69	11·07
Bacillary Dysentery	8·84	8·38	8·05	9·03	8·06	11·47	7·80	9·04	12·13	8·21	9·75	11·14
Malaria—All	8·64	8·43	6·58	9·08	8·96	7·18	8·23	5·12	7·51	2·05	19·16	10·95
Sandfly Fever	7·57	3·72	8·00	8·83	7·21	9·31	8·07	11·47	8·31	8·80	3·63	7·29
P.U.O.	6·74	3·84	13·93	5·29	6·12	7·82	7·11	8·63	7·65	3·23	7·82	5·76
Accidental Injuries	5·03	4·93	4·88	4·77	5·58	4·88	5·65	2·75	5·34	2·64	3·63	4·53
Accidental Burns	1·64	1·39	1·57	1·74	1·45	1·66	1·97	1·80	0·94	0·29	1·25	1·80
Other Injuries	1·25	3·20	1·54	1·05	1·33	0·74	0·55	0·32	0·03	—	—	0·36
Infective Hepatitis	4·79	6·10	4·30	4·63	4·47	5·73	4·83	3·52	4·48	5·57	3·51	3·39
Impetigo	3·37	4·31	3·13	3·84	3·02	2·60	3·25	2·34	2·65	2·93	2·95	2·99
Bronchitis	3·29	3·11	2·78	2·77	3·63	3·03	3·56	4·37	4·03	4·99	5·33	3·70
Gonorrhoea	2·68	3·29	3·34	2·60	2·48	1·77	2·70	1·60	2·00	0·88	3·63	1·90
Common Cold	2·62	2·82	2·06	2·30	2·62	2·75	2·30	5·59	2·27	3·81	2·38	2·58
Psychoneuroses	2·61	4·85	2·06	2·16	2·35	2·17	2·46	1·65	2·00	2·64	2·49	1·90
Psychoses	0·33	0·40	0·25	0·25	0·26	0·40	0·42	0·29	0·46	—	1·13	0·34
Scabies	2·29	3·51	1·92	2·41	2·46	1·94	1·92	1·35	1·88	1·47	1·93	1·40
Otitis Media	2·01	1·84	1·83	2·31	2·42	2·22	1·90	1·51	1·17	0·88	2·04	1·97
Otitis Externa	1·10	1·01	0·98	1·37	1·16	1·49	0·89	1·01	0·97	0·88	0·57	1·08
Rheumatic Conditions	2·00	2·13	1·89	1·94	1·83	1·75	2·12	2·41	1·94	2·05	1·70	2·10
Dyspepsia and Gastritis	1·82	1·65	1·44	1·62	1·84	1·62	2·23	3·13	1·28	2·64	1·81	3·08
Boils and Carbuncles	1·80	1·71	1·77	1·70	1·70	1·39	1·96	2·59	1·83	0·29	2·15	1·99
Dermatitis	1·76	1·67	1·65	1·92	1·88	1·41	1·82	1·58	1·80	1·17	2·04	2·04
Haemorrhoids	1·63	1·57	1·35	1·76	1·56	1·71	1·81	1·22	1·43	0·88	1·93	1·99
Diphtheria	1·52	2·24	1·24	1·39	1·28	1·24	1·30	1·15	1·88	0·88	0·79	1·99
Amoebiasis	1·36	1·25	0·97	1·36	1·52	1·28	1·25	2·03	1·66	2·25	1·02	1·42

TABLE 71 (*contd.*)

Relative Casualty Rates by Arms of Service—M.E.F.; British Army Other Ranks; 1943

	Total	Infantry	R.A.C.	R.A.	R.E.	R. Sigs.	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.
Appendicitis	1·30	1·30	1·28	1·35	1·08	1·53	1·33	1·37	1·08	0·88	1·13	1·33
Pneumonia—All	1·24	1·05	1·20	1·09	1·30	1·56	1·39	1·33	1·66	2·35	1·47	1·44
Hernia	1·15	0·95	0·83	1·24	1·11	0·94	1·57	1·37	1·11	0·59	1·13	1·26
Epidermophytosis	1·05	1·07	0·94	1·18	1·25	1·09	0·87	1·42	0·83	0·29	0·45	0·91
Varicose Veins	0·96	1·00	0·84	1·07	0·77	0·58	0·95	1·04	—	15·25	0·91	0·80
Neoplasms	0·95	0·77	0·84	1·10	0·87	1·00	0·98	0·94	1·06	0·88	1·13	1·14
Sinusitis	0·83	0·74	0·89	0·81	0·85	1·11	0·69	1·42	0·77	1·76	0·45	1·03
Conjunctivitis	0·78	0·83	0·79	0·76	0·93	0·49	0·75	—	1·31	—	0·57	1·00
I.D.K.	0·60	0·88	0·65	0·67	0·54	0·41	0·42	0·43	0·37	—	—	0·69
Early Syphilis	0·59	0·56	0·50	0·61	0·57	0·34	0·71	0·27	0·37	—	1·02	0·64
Keratitis	0·53	0·51	0·50	0·49	0·59	0·47	0·52	0·47	0·88	0·29	0·79	0·78
Influenza....	0·46	0·45	0·41	0·37	0·70	0·89	0·30	0·56	0·46	0·59	0·34	0·41
Foot Deformities	0·46	0·84	0·52	0·44	0·36	0·28	0·38	0·29	0·46	—	0·57	0·30
Cystitis and Pyelitis	0·45	0·46	0·38	0·44	0·60	0·53	0·14	0·56	0·37	0·88	0·57	0·28
Duodenal Ulcer	0·25	0·20	0·25	0·22	0·29	0·21	0·33	0·34	0·34	1·17	0·11	0·16
Gastric Ulcer	0·06	0·05	0·25	—	0·01	0·11	0·08	0·11	—	—	—	0·05
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

TABLE 72

Relative Casualty Rates by Arms of Service—M.E.F.; British Army Other Ranks; 1944

	Total	Infantry	R.A.C.	R.A.	R.E.	R. Sigs.	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.
Tonsillitis and Pharyngitis	10·95	10·17	9·68	11·23	11·03	11·55	10·89	11·20	13·08	17·34	7·41	10·40
Bacillary Dysentery	8·64	6·88	7·08	8·40	8·92	8·87	8·77	10·00	11·60	11·46	8·52	11·19
Malaria—All	16·31	23·81	25·28	16·06	13·20	14·29	12·20	11·42	11·07	1·24	19·87	16·14
Sandfly Fever	3·38	2·47	2·88	3·43	3·66	3·59	4·05	4·68	3·84	7·12	3·00	2·47
P.U.O.	7·66	6·43	7·32	7·13	7·15	8·43	7·88	10·00	8·50	5·88	7·89	7·48
Accidental Injuries	5·45	4·48	5·28	5·58	7·48	5·41	5·60	3·97	5·14	3·41	5·36	5·08
Accidental Burns	1·07	0·89	1·44	1·11	0·97	0·88	1·00	1·29	0·44	—	0·63	1·13
Other Injuries	0·25	0·65	0·48	0·15	0·13	0·03	0·08	0·13	0·09	—	—	0·16
Infective Hepatitis	3·81	3·81	4·16	3·88	3·84	4·85	3·78	2·59	3·44	6·81	2·68	3·58
Impetigo	1·98	2·44	2·08	2·00	1·93	1·54	1·72	1·34	1·83	0·62	2·84	1·82
Bronchitis	3·54	3·03	2·36	3·28	3·34	3·30	4·19	5·58	4·58	2·48	4·57	3·45
Gonorrhoea	1·79	2·51	1·56	1·40	2·20	1·32	2·10	0·71	1·18	0·93	2·68	1·24
Common Cold	3·53	2·72	2·92	3·23	3·75	3·90	4·07	5·80	4·23	5·26	3·47	3·77
Psychoneuroses	2·87	3·35	2·24	2·46	2·69	2·58	3·39	2·01	2·75	5·26	3·79	3·26
Psychoses	0·48	0·40	0·36	0·53	0·49	0·48	0·58	0·40	0·52	—	0·32	0·47
Scabies	1·12	1·27	1·24	0·94	1·28	1·10	1·11	1·16	0·61	0·31	0·95	1·16
Otitis Media	1·76	1·83	2·28	1·82	2·26	2·30	1·47	1·47	1·66	0·93	0·95	1·66
Otitis Externa	0·88	0·89	0·84	0·80	0·95	1·13	0·79	1·34	0·87	0·62	0·32	1·21
Rheumatic Conditions	1·92	1·60	1·68	1·93	1·13	2·49	2·25	2·05	2·31	2·17	3·15	1·79
Dyspepsia and Gastritis	1·89	1·74	1·60	1·77	2·26	1·60	2·14	2·41	1·61	1·55	2·37	1·95
Boils and Carbuncles	2·32	1·84	2·32	2·78	2·55	2·05	2·31	3·08	2·53	1·24	2·21	2·00
Dermatitis	1·85	1·58	1·36	2·13	2·51	1·79	1·83	2·01	2·01	0·62	1·89	1·40
Haemorrhoids	1·61	1·48	1·00	1·79	1·86	1·48	1·64	1·52	1·09	2·48	2·05	1·63
Diphtheria	0·91	1·19	1·12	0·94	0·78	0·66	0·65	0·94	1·05	0·62	0·63	1·00
Amoebiasis	1·22	1·09	0·88	1·30	1·31	1·26	1·40	1·29	0·92	1·86	1·42	1·11

TABLE 72 (*contd.*)

Relative Casualty Rates by Arms of Service—M.E.F.; British Army Other Ranks; 1944

	Total	Infantry	R.A.C.	R.A.	R.E.	R. Sigs.	R.A.S.C.	R.A.M.C. and A.D.C.	R.A.O.C.	R.A.P.C.	P.C.	R.E.M.E.
Appendicitis	1·33	1·47	1·08	1·34	1·13	1·64	1·26	1·20	1·74	1·86	0·63	1·24
Pneumonia—All	1·84	1·61	2·00	1·87	1·91	2·27	2·18	2·01	2·01	1·86	1·10	1·63
Hernia	1·41	0·97	1·16	1·84	0·89	1·20	1·69	1·52	1·61	1·55	0·63	1·63
Epidermophytosis	0·68	0·52	0·48	0·66	0·71	0·94	0·60	1·03	1·09	0·31	0·63	0·87
Varicose Veins	1·26	1·18	1·04	1·73	0·95	1·04	1·06	1·03	—	10·53	1·10	1·40
Neoplasms	1·11	0·92	1·08	1·34	1·09	1·10	1·23	0·85	0·65	1·24	0·95	1·47
Sinusitis	1·10	1·06	1·00	1·04	1·00	1·13	1·27	1·07	1·13	0·93	0·79	1·42
Conjunctivitis	0·79	0·72	0·88	0·75	0·91	0·82	0·83	—	1·79	0·31	0·79	0·92
I.D.K.	0·07	0·08	0·20	0·03	0·07	0·13	0·11	0·04	0·09	—	0·16	0·03
Early Syphilis	0·98	1·10	0·92	1·04	1·38	0·41	0·99	0·45	0·65	0·31	1·26	0·95
Keratitis	0·53	0·50	0·24	0·56	0·62	0·38	0·69	0·49	0·39	0·31	0·63	0·79
Influenza	0·49	0·23	0·20	0·61	0·58	0·79	0·66	0·45	0·57	0·31	0·32	0·45
Foot Deformities	0·27	0·39	0·12	0·33	0·16	0·13	0·28	0·31	0·26	0·31	0·16	0·16
Cystitis and Pyelitis	0·35	0·20	0·20	0·33	0·33	0·44	0·53	0·31	0·61	—	0·32	0·21
Duodenal Ulcer	0·45	0·30	0·52	0·45	0·40	0·57	0·56	0·76	0·31	—	1·42	0·21
Gastric Ulcer	0·13	0·11	0·68	—	0·22	0·16	0·14	0·13	0·17	—	0·16	0·08
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

§2 (*contd.*) MEDICAL WASTAGE OF DIFFERENT ARMS OF THE SERVICE; M.E.F. 1943 AND 1944

TABLE 73

Coefficients of Variation w.r.t. Arms of Service

<35				35—50				> 50			
1943		1944		1943		1944		1943		1944	
Otitis externa	20·4	Otitis externa	25·2	Sandfly Fever	35·4	Sandfly Fever	37·8	I.D.K.	57·1	I.D.K.	67·9
Bacillary Dysentery	20·7	Bacillary Dysentery	20·4	Keratitis	35·4	Keratitis	39·0	Malaria	62·4	Malaria	54·1
Infective Hepatitis	20·8	Infective Hepatitis	31·5	Conjunctivitis	36·3	Conjunctivitis	45·9	Duodenal Ulcer	92·4	Duodenal Ulcer	63·7
Tonsillitis	21·5	Tonsillitis	26·5	Psychoses	39·6	Psychoses	36·7	Gastric Ulcer	115·2	Gastric Ulcer	99·2
Appendicitis	21·7	Appendicitis	32·1	P.U.O.	44·9	P.U.O.	42·3				
Dermatitis	23·3	Dermatitis	30·7	Sinusitis	46·5	Sinusitis	43·8				
Otitis media	24·0	Otitis media	34·7	Gonorrhoea	46·5	Gonorrhoea	47·4				
Haemorrhoids	25·2	Haemorrhoids	28·7								
Hernia	31·7	Hernia	30·3								
Pneumonia	33·1	Pneumonia	25·0								
Accidental Injuries	33·7	Accidental Injuries	19·2								
Impetigo	20·4			Burns	37·2	Impetigo	38·4			Burns	54·4
Diphtheria	28·2					Diphtheria	39·6				
Scabies	29·5					Scabies	37·5				
		Psychoneuroses	30·6	Psychoneuroses	35·2	Early Syphilis	42·6	Early Syphilis	67·1		
		Influenza	31·2	Influenza	35·7						
		Bronchitis	34·2	Bronchitis	36·5						
		Amoebiasis	27·7	Amoebiasis	38·1						
		Dyspepsia and Gastritis	26·3	Dyspepsia and Gastritis	40·1						
		Boils and Carbuncles	30·4	Boils and Carbuncles	42·7						
		Common Cold	33·5	Common Cold	48·4						

TABLE 74

Morbidity Differentials w.r.t. Arms of Service

RELATIVELY HIGH RATES						RELATIVELY LOW RATES			
R A.P.C.	R.A.M.C. and A.D.C.	PIONEER CORPS	R.A.O.C.	R.A.C.	INFANTRY	R.A.P.C.	R.A.M.C.	PIONEER CORPS	R.A.O.C.
Tonsillitis Sandfly Fever Infective Hepatitis Common Cold Varicose Veins	Sandfly Fever Common Cold Bronchitis P.U.O.	Bronchitis Gonorrhoea	Conjunctivitis	Gastric Ulcer	Psychoneurosis	Malaria P.U.O. Gonorrhoea Syphilis Conjunctivitis Otitis Media Boils and Carbuncles Dermatitis Epidermo-phytosis I.D.K. Accidental Injuries Burns Psychoses Gastric Ulcer	Gonorrhoea Syphilis Conjunctivitis Accidental Injuries	Tonsillitis	Burns

THIS section is based on a sample analysis of A.Fs. I1220. Except where otherwise stated it therefore refers to hospital cases alone.

Every fifth record card (A.F.I1220) was coded. The sample embodies 40,000 cases. Since we are here concerned with *major* sources of wastage, as opposed to *rare* diseases, we may take it that the sampling error of rates cited is trivial. There are strong grounds for believing that the *total* number of A.Fs. I1220 received is somewhat deficient, though the exact extent of the deficiency is not known. Consequently, ensuing tables deal mainly with *relative* as opposed to *absolute* morbidity and wastage rates. Since the ratio of A.Fs. I1220 received to total strength is almost identical for both officers and other ranks, comparison of relative rates w.r.t. these two groups (Table 75) should, however, produce results in close agreement with those based on the total hospitalized population. Limitations of available information referring to the period under discussion prevent standardization with respect to age and duration of service overseas, so that all rates cited are based on crude figures. Indices here used are essentially the same as for previous analysis of United Kingdom and M.E.F. data, *viz.: Relative Morbidity Rate* (R.M.R.), *Relative Casualty Rate* (R.C.R.), *Relative Wastage Rate* (R.W.R.), and *Mean Duration of Stay* (M.D.S.). In addition *Relative Monthly Rates* are used as a measure of seasonal fluctuation.

Morbidity and Hospital Wastage among Officers and Other Ranks

Disease accounted for more than three-quarters of total admissions to hospital among the British Army in Italy during 1944 (Table 75 and Chart 15). The first six items alone, *viz.*: *Malaria*, *Venereal Disease*, *Psychiatric Disorders*, *Dysentery and Diarrhoea*, *Infective Hepatitis*, and *Cellulitis and I.A.T.*, make up half of all admissions w.r.t. disease. Of these six, two, Malaria and Dysentery, etc., are tropical diseases almost entirely absent from the United Kingdom, and a third, Infective Hepatitis occurs less commonly among troops in this country. Among specialist groups, Diseases of the Ear, Nose and Throat, Diseases of the Skin and Areolar tissues together with Psychiatric disorders account jointly for over one-fifth of *all* admissions.

The most striking fact emerging from comparison between statistics of disease among *officers* and among *other ranks* is the very high contribution of Infective Hepatitis to overall officer morbidity—nearly three times the corresponding rate among other ranks. Similarly, officers are between two and three times as liable to Dyspepsia and Gastritis and to Sinusitis. Other ranks, on the other hand, are much more prone to Hernia, Otitis Media and Externa and Skin conditions. The outstanding discrepancy w.r.t. V.D. may be at least partly attributable to administrative considerations w.r.t. certification of V.D. as such. In contradistinction to Dyspepsia and Gastritis, Infective Hepatitis is more prevalent in the younger age groups which are relatively more common among other ranks. Although it is not possible to say how far differences mentioned above are due to differences w.r.t. age distribution, living conditions or occupations, it is therefore possible to say with certainty that the striking officer excess w.r.t. this disease is *not* due to differential age distribution. Age standardization would certainly accentuate rather than diminish the officer-other rank differential.

Over 85% of the recorded cases of Malaria, which itself makes the greatest contribution among single diseases to morbidity as a whole, are attested as of the *Benign Tertian* type by blood smear examination (Table 76). If we assume that 10% designated *Clinical* were mostly B.T. this type accounts for about 95% of all Malaria cases admitted to hospital in Italy during 1944. *Gonorrhoea*, as usual the most common form of venereal disease admitted to hospital, occurred nearly seven times as frequently as Syphilis documented as such; but it is noteworthy that *Chancroid* accounts for 20% of all venereal cases, and it is possible that an appreciable proportion of cases diagnosed as Chancroid were in fact Syphilitic infections. If so, the Gonorrhoea-Syphilis ratio cited is probably too high. Nearly all Jaundice was due to Infective Hepatitis. More than two-fifths of all Skin conditions were caused by Boils and Carbuncles or Impetigo. Anxiety Neurosis was more than four times as common as Hysteria, which itself occurred much more frequently than any other form of Psychiatric disorder. No more than 30% of cases of Dysentery and Diarrhoea were established as Bacillary Dysentery by slide diagnosis and only 5% as Protozoal. Nearly 60% were classified as Gastro-enteritis or Diarrhoea, and the latter alone accounts for 25% of all cases in this group.

Table 77 (*see* also Chart 15) shows that six items make up half of total *man-day wastage* due to disease, as well as half the cases. Five of these six are common to both morbidity and wastage though only three of them (*Malaria*, *V.D.*, and the *Dysentery* group), retain the same rank. The need for assessing wastage as well as morbidity when considering the importance of individual diseases is strikingly demonstrated by rates w.r.t. *Sandfly Fever* and *Diphtheria*. Whereas the former actually ranks higher in the morbidity list, its contribution to man-day wastage is only *one-seventh* that of Diphtheria. The latter is twentieth on the morbidity scale but ranks sixth in the hierarchy of wastage. As we might expect from what we know of army sickness in the United Kingdom, Hernia is also a much greater source of wastage than of morbidity. All diseases taken together were responsible for two-thirds of total wastage compared with one-quarter due to battle injuries and rather less than one-tenth attributable to accidents. Skin diseases and Cellulitis between them were responsible for nearly 10% of wastage, a greater contribution than that due to accidents.

The mean period off duty was less for disease than for accidents and both of these were considerably less than the corresponding figure for battle injuries. If we ignore stay in advanced medical units, the time spent off duty as a result of sickness or injury may be spent wholly in hospital or partly in hospital and partly in convalescent depot (Chart 16). These two classes of unit involve different types of treatment as well as different problems of accommodation and staff requirements. Consequently, Table 78 presents separate budgets for the two and also records for each disease the proportion of hospital admissions sent on to C.D. and the proportion of total wastage spent in such depots. Mean duration of stay in hospital varied with the disease from a minimum of nine days for *Sandfly Fever* and *Balanitis* (including Posthitis) to a maximum of 46·5 days for *Diphtheria*. The average period in hospital for all diseases was 18·0 days while battle injuries involved a stay of 26·6 days compared with only 16·6 days for accidents. The mean period spent at convalescent depots *by those cases which actually went there*, varied much less from disease to disease than the corresponding time in hospital. With four exceptions the mean stay in convalescent depot for such cases varied between 17 and 30 days. The average duration of stay for all diseases taken together, was three weeks as compared with over four weeks for both battle injuries and accidents. Only one-quarter of hospital admissions caused by disease went to convalescent depot, while nearly two-thirds of cases injured in battle and one-third of accidental injuries involved stay in these units. More than three-quarters of all cases of Diphtheria, Hernia and Appendicitis and more than half those of Infective Hepatitis, Pneumonia and I.D.K. needed convalescent rehabilitation. On the other hand, less than one-tenth of patients with Psychiatric disorders, Balanitis (including Posthitis) and

Venereal Disease were sent to convalescent depots. The proportion of time spent in rehabilitation at convalescent depot level expressed as a proportion of *total* time off duty (excluding forward medical units) was in general less than a third. It is not surprising that it was higher with respect to Infective Hepatitis, Appendicitis, Hernia, Varicose Veins and I.D.K. but very low for V.D., Scabies and Balanitis. The first five diseases listed in Table 78 contribute over 45% to relative wastage at *both* hospital and convalescent depot level. Nearly three-quarters of wastage in *hospitals* was due to disease and only one-quarter to battle injuries and accidents taken together. On the other hand at *convalescent depot level*, little more than one half is attributable to disease, while battle injuries account for the majority of the remainder.

Seasonal Fluctuations

Diseases which do not necessarily involve hospital admission may be treated in hospital, so long as accommodation permits—but may be dealt with in field units when available hospital accommodation becomes more limited owing to periods of intense battle activity, a peak in the incidence of an epidemic disease or other circumstances. It is therefore more profitable to study seasonal fluctuation of diseases on the basis of *all* cases rather than on the basis of hospital cases alone. This applies to absolute figures and even more so to relative rates, since one cannot assume that the proportion of any given disease treated in hospital, as opposed to minor medical units, is constant from month to month. Fortunately, figures covering *all* medical units in Italy and Sicily are available from consolidated returns with respect to the main communicable diseases. A comparison between rates based on these figures and rates based on hospital notifications alone, reveals, as one would expect, certain divergencies. These may be due not only to the reason outlined above and to the known absolute deficiency of A.Fs. I1220 but also to possible differences w.r.t. the nature of the cases included under any given diagnostic heading. In the circumstances it would be wiser to derive our seasonal picture primarily from the consolidated returns. The most convenient way of comparing the seasonal fluctuation of several diseases is to express the monthly rate for each as a percentage of the total annual incidence of that disease. This eliminates the influence of differences w.r.t. *absolute* incidence of the diseases under review. *Relative Monthly Rates* calculated in this way from the consolidated returns appear in Table 79 with corresponding A.F. I1220 figures above for purposes of comparison. In view of the many possible sources of discrepancy, it is noteworthy that the seasonal trend disclosed by figures of either sort is much the same. This is apparent from Chart 17 which shows superimposed histograms for the main diseases based on Relative Monthly Rates w.r.t. (*a*) cases treated in hospital, and (*b*) cases treated in all medical units. The section in solid black represents the part common to both series of figures; where the Relative Monthly Rate is higher for the *hospital-only* series, the extent of the excess is indicated by *diagonal* shading, where higher w.r.t. cases treated in *all medical units*, the excess is shaded with *dots*. The relatively large area in solid black thus emphasizes the consistency of figures coming from these two independent sources. Closest agreement between the two series occurs w.r.t. Infective Hepatitis, possibly because this is a clear-cut entity almost invariably involving admission to hospital.

Both w.r.t. hospital admissions and to total cases, Diphtheria and Infective Hepatitis have peak incidence during the winter months. Bronchitis, for which we have hospital figures only, was also most common in the winter. On the other hand, Dysentery was most prevalent during July. A striking fact about Malaria is its comparatively narrow range of seasonal variation. Monthly rates in Italy remain relatively uniform during the period March—August and taper off gradually at either end of this plateau. The incidence of *All Diseases* among troops in Italy was comparatively constant throughout the year. This is partly due to the accident, fortunate from the view-point of hospital accommodation, that the two main epidemic diseases *viz.*: Malaria and Infective Hepatitis have seasonal movements which are largely compensatory. Rates w.r.t. *Accidents* are worthy of comment insofar as monthly hospital admission rates varied surprisingly little during the year despite considerable fluctuations in the Battle Injury rate.

Table 80 shows the proportionate contribution of certain diseases to total morbidity in each of the calendar quarters. These figures include hospital cases only. Four diseases, *viz.*: Malaria, Venereal Disease, Infective Hepatitis and Dysentery taken together caused approximately one-third of total admissions to hospital in each quarter. Malaria was the major problem; it was never much less than a tenth of all diseases and during the peak quarter made up fully *one-fifth* of all hospital sick cases. Venereal Disease was also a constant source of wastage, representing some 10% of all disease throughout the year. The contribution of Infective Hepatitis and Dysentery varied greatly with the seasons, but in no quarter did either of these conditions make up as much as 10% of all hospital cases. Although there are substantial disparities in the month-to-month figures, it is worth recording that *annual* A.F. I1220 totals w.r.t. each of the diseases cited make up a fairly constant proportion of the corresponding totals based on consolidated returns. Such differences as do occur are plausibly attributable to differential likelihood w.r.t. liability to hospitalization. To the extent that annual rates based on A.F. I1220 are consistent with more comprehensive data from other sources (i.e. consolidated returns) we may infer that limitations discussed above w.r.t. seasonal fluctuations do not materially detract from the reliability of *annual* rates based on the former as cited in Tables 75-78.

Summary

A sample analysis of Hospital Record Cards (A.Fs. I1220) from Italy (1944) draws attention to the following conclusions:

(*a*) *Malaria and Venereal disease* together accounted for more than a quarter of all hospital admissions w.r.t. disease. Psychiatric Disorders, Dysentery and Diarrhoea, Infective Hepatitis and Cellulitis (incl.: I.A.T.) between them accounted for a further quarter.

(*b*) Disease was responsible for two-thirds of total *man-day wastage* in hospital and convalescent depot taken together. Battle Casualties and Accidental Injuries made up a quarter and a tenth respectively.

(*c*) Mean Duration of Stay in hospital and convalescent depot was slightly less than 3½ weeks for Disease, 4 weeks for Accidental Injuries and nearly 7 weeks for Battle Casualties. A much higher proportion of the last mentioned went to convalescent depot than either of the other two classes.

(*d*) The seasonal fluctuations of the two main epidemic diseases *viz.*: Malaria and Infective Hepatitis were largely compensatory.

TABLE 75

Relative Morbidity and Casualty Rates : British Army, Italy, 1944

	Other Ranks	Officers	Total
Malaria (All Types)	16·4	10·1	16·1
Venereal Disease	11·0	2·4	10·5
Psychiatric Disorders	6·3	5·0	6·2
Dysentery and Diarrhoea	5·9	7·7	6·0
Infective Hepatitis	5·9	15·9	6·4
Cellulitis and I.A.T.	5·2	3·5	5·1
Tonsillitis and Pharyngitis	4·3	4·3	4·3
P.U.O.	3·2	4·0	3·3
Otitis Media and Externa	2·0	1·2	2·0
Bronchitis	2·0	1·8	2·0
Pneumonia	1·9	1·8	1·9
Dermatitis	1·9	1·0	1·8
Boils and Carbuncles	1·7	1·9	1·7
Rheumatic Conditions	1·6	1·9	1·6
Common Cold	1·5	1·8	1·5
Impetigo	1·4	0·7	1·4
Dyspepsia and Gastritis	1·2	3·0	1·3
Sandfly Fever	1·2	2·5	1·3
Haemorrhoids	1·2	1·2	1·2
Diphtheria	1·1	0·9	1·1
Hernia	0·9	0·3	0·9
Appendicitis	0·7	1·1	0·7
Synovitis and Arthritis	0·7	0·5	0·7
Conjunctivitis	0·7	0·2	0·7
Scabies	0·7	0·3	0·6
I.D.K.	0·6	0·7	0·6
Balanitis and Posthitis	0·6	0·2	0·5
Varicose Veins	0·5	0·4	0·5
Epidermophytosis	0·5	0·3	0·5
Sinusitis	0·4	1·0	0·4
Cystitis and Pyelitis	0·4	0·4	0·4
Keratitis	0·4	0·2	0·3
Vincent's Angina and Gingivitis	0·2	0·4	0·2
T.B. (All types)	0·2	0·3	0·2
Peptic Ulcer	0·1	0·4	0·1
Other Diseases	15·6	21·0	15·9
All Diseases	100·0 (31,429)	100·0 (1,654)	100·0 (33,083)

	Other Ranks	Officers	Total
Diseases of Ear, Nose and Throat	5·8	5·4	5·8
Diseases of the Skin	5·7	3·8	5·6
Psychiatric Disorders	4·9	3·6	4·8
Cellulitis and I.A.T.	4·0	2·5	4·0
Genito-Urinary Disorders	2·1	2·3	2·1
Diseases of the Eye	1·1	0·4	1·0
Diseases of Mouth, Teeth and Gums	0·4	1·1	0·4
Other Diseases	53·5	54·2	53·6
ALL DISEASES	77·5	73·2	77·2
ALL ACCIDENTS	8·6		
		26·8	22·8
ALL BATTLE CASUALTIES	13·8		
ALL CASES	100·0 (40,575)	100·0 (2,259)	100·0 (42,834)

TABLE 76

Detailed Breakdown of Certain Diseases and Disease Groups shown in Table 75; Other Ranks

MALARIA	
B.T.	86·5
M.T.	3·3
Q.	0·2
Clinical	10·0
	100·0 (16·4)
VENEREAL DISEASE	
Gonorrhoea	59·4
Gonorrhoea Uncertain	6·4
Syphilis	9·1
Chancroid	22·0
Others	3·1
	100·0 (11·0)
DISEASES OF EAR, NOSE AND THROAT	
Tonsillitis and Pharyngitis	56·8
Otitis Media	17·5
Otitis Externa	9·5
Sinusitis	5·5
Others	10·7
	100·0 (7·5)
SKIN CONDITIONS	
Boils and Carbuncles	23·4
Impetigo	18·9
Epidermophytosis—Groin	0·8
Feet	3·7
Other	2·3
Dermatitis	25·7
Others	25·2
	100·0 (7·3)
PSYCHIATRIC DISORDERS	
Psychoses	4·2
Anxiety Neurosis	72·0
Hysteria	17·4
Psychopathic Personality	4·0
Mental Deficiency	1·3
Others	1·1
	100·0 (6·3)
JAUNDICE	
Infective Hepatitis	94·3
Weil's Disease	0·2
Post Arsphenamine Jaundice	5·5
	100·0 (6·2)
DYSENTERY and DIARRHOEA	
Dysentery-Protozoal (including Amoebic)	4·7
Dysentery-Bacillary—Flexner	1·0
Sonne	0·2
Shiga	0·1
Unspecified	28·2
Dysentery-Unspecified	8·1
Enteritis and Gastro-Enteritis	33·2
Diarrhoea	24·5
	100·0 (5·9)
PNEUMONIA	
Lobar	32·2
Primary Atypical	48·6
Secondary (incl. Influenzal)	9·9
Others and Unspecified	9·3
	100·0 (1·9)
EYE DISEASES	
Conjunctivitis	49·9
Keratitis	25·6
Others	24·5
	100·0 (1·4)
DIPHTHERIA	
Faucial, Laryngeal and Nasal	62·4
Cutaneous	10·3
Others and Unspecified	27·3
	100·0 (1·1)

Figures in brackets are Relative Morbidity Rates.

TABLE 77 **Relative Wastage and Morbidity Rates and Overall Mean Duration of Stay: British Army Other Ranks: Italy, 1944**

	R.W.R.	R.M.R.	M.D.S. Overall	Ranks: Wastage	Ranks: Morbidity
Malaria (All Types)	15·4	16·4	22·2	1	1
Venereal Disease	10·7	11·0	23·2	2	2
Infective Hepatitis	8·2	5·9	32·9	3	5
Dysentery and Diarrhoea	5·9	5·9	23·8	4	4
Cellulitis and I.A.T.	5·9	5·2	27·1	5	6
Diphtheria	3·4	1·1	71·4	6	20
Pneumonia	3·3	1·9	40·8	7	11
Tonsillitis and Pharyngitis	3·0	4·3	16·8	8	7
Psychiatric Disorders	2·9	6·3	10·8	9	3
Dermatitis	2·4	1·9	30·5	10	12
P.U.O.	2·2	3·2	16·3	11	8
Hernia	2·1	0·9	56·0	12	21
Boils and Carbuncles	2·1	1·7	28·3	13	13
Bronchitis	2·0	2·0	24·3	14	10
Rheumatic Conditions	1·9	1·6	27·7	15	14
Otitis Media and Externa	1·6	2·0	19·1	16	9
Impetigo	1·6	1·4	27·7	17	16
Haemorrhoids	1·5	1·2	28·3	18	19
Appendicitis	1·3	0·7	44·2	19	22
Dyspepsia and Gastritis	1·0	1·2	18·7	20	17
Synovitis and Arthritis	0·9	0·7	30·0	21	23
Varicose Veins	0·8	0·5	39·1	22	28
Common Cold	0·8	1·5	13·0	23	15
I.D.K.	0·6	0·6	26·3	24	26
Epidermophytosis	0·6	0·5	28·9	25	29
Sandfly Fever	0·5	1·2	8·9	26	18
Conjunctivitis	0·5	0·7	18·7	27	24
Scabies	0·5	0·7	18·4	28	25
Keratitis	0·5	0·4	30·1	29	32
Sinusitis	0·4	0·4	21·8	30	30
Cystitis and Pyelitis	0·4	0·4	26·0	31	31
Balanitis and Posthitis	0·2	0·6	9·5	32	27
Other Diseases	16·9	16·0	25·1		
All Diseases	100·0	100·0 (*31,429*)	23·7		

	R.W.R.	R.C.R.	M.D.S. Overall	Ranks: Wastage	Ranks: Morbidity
Diseases of the Skin	6·0	5·7	28·7	1	2
Cellulitis and I.A.T.	4·0	4·0	27·1	2	4
Diseases of Ear, Nose and Throat	3·8	5·8	18·0	3	1
Psychiatric Disorders	1·9	4·9	10·8	4	3
Genito-Urinary Disorders	1·4	2·1	17·9	5	5
Diseases of the Eye	0·9	1·1	22·4	6	6
Diseases of Mouth, Teeth and Gums	0·2	0·4	10·2	7	7
Other Diseases	49·2	53·5	25·1		
ALL DISEASES	67·3	77·5	23·7		
ALL ACCIDENTS	8·9	8·7	27·8		
ALL BATTLE CASUALTIES	23·8	13·8	46·9		
ALL CASES	100·0	100·0 (*40,575*)	27·3		

TABLE 78 **Wastage and Duration of Stay in Hospital and Convalescent Depot separately: British Army Other Ranks: Italy, 1944**

	Hospital only		Convalescent Depot only			
	M.D.S. (days)	R.W.R.	Proportion sent to C.D.	M.D.S.* (days)	R.W.R.	C.D. Wastage ÷ Total Wastage (%)
Malaria (All Types)	15·9	14·4	36·2	17·4	18·1	28·4
Venereal Disease	22·9	13·9	1·3	22·9	0·6	1·3
Infective Hepatitis	20·2	6·6	66·2	19·2	13·1	38·6
Dysentery and Diarrhoea	17·7	5·8	27·1	22·4	6·3	25·6
Cellulitis and I.A.T.	19·1	5·5	31·4	25·5	7·3	29·5
Diphtheria	46·5	3·0	76·3	32·7	5·0	34·9
Pneumonia	26·2	2·8	63·2	23·1	4·8	35·8
Tonsillitis and Pharyngitis	13·1	3·1	21·9	16·8	2·8	22·0
Psychiatric Disorders	9·6	3·4	5·4	22·6	1·3	11·1
Dermatitis	26·6	2·8	20·2	19·2	1·3	12·8
P.U.O.	13·0	1·3	15·9	20·5	1·9	20·3
Hernia	34·1	1·7	77·4	28·3	3·5	39·1
Boils and Carbuncles	21·4	2·0	26·4	26·3	2·1	24·4
Bronchitis	17·4	1·9	32·4	21·2	2·4	28·4
Rheumatic Conditions	18·5	1·6	35·5	26·0	2·6	33·2
Otitis Media and Externa	15·9	1·8	16·1	20·1	1·1	16·8
Impetigo	24·2	1·9	20·0	17·5	0·9	12·6
Appendicitis	21·4	0·9	80·6	28·3	2·9	51·6
Haemorrhoids	20·8	1·1	29·0	25·9	1·3	26·5
Dyspepsia and Gastritis	15·3	1·0	17·1	19·8	0·7	18·2
Synovitis and Arthritis	21·1	0·8	40·0	22·2	1·1	29·7
Varicose Veins	21·6	0·6	40·0	43·8	1·5	44·8
Common Cold	10·9	0·9	8·1	26·1	0·6	16·2
Sandfly Fever	8·9	0·7	—	—	—	—
I.D.K.	13·9	0·4	54·2	22·8	1·2	47·2
Epidermophytosis	25·6	0·7	12·5	26·0	0·2	11·4
Conjunctivitis	15·1	0·6	18·2	19·8	0·4	19·3
Scabies	16·6	0·6	5·7	32·7	0·2	9·8
Keratitis	24·7	0·5	20·7	26·3	0·3	17·9
Sinusitis	17·5	0·4	25·0	17·3	0·3	19·7
Cystitis and Pyelitis	22·5	0·4	26·3	13·2	0·2	13·5
Balanitis and Posthitis	8·9	0·3	2·1	26·0	0·7	6·3
Other Diseases	15·7	16·2	20·0	20·0	13·2	—
All Diseases	18·0	100·0	26·1	21·7	100·0	24·1
Diseases of the Skin	24·4	7·3	19·8	21·6	1·1	15·0
Cellulitis and I.A.T.	19·1	4·0	31·4	25·5	1·5	29·5
Diseases of Ear, Nose and Throat	14·3	4·4	20·6	18·2	1·0	20·6
Psychiatric Disorders	9·6	2·4	5·4	22·6	0·3	11·1
Genito-Urinary Disorders	14·9	1·6	14·4	21·1	0·3	16·8
Diseases of the Eye	18·3	1·0	18·3	22·2	0·2	18·3
Diseases of Mouth, Teeth and Gums	10·2	0·2	—	—	—	—
Other Diseases	18·6	52·6	30·3	21·3	48·9	16·1
ALL DISEASES	18·0	73·5	26·1	21·7	53·3	24·1
ALL ACCIDENTS	16·6	7·6	37·0	30·5	11·9	40·5
ALL BATTLE CASUALTIES	26·6	18·9	68·4	30·6	34·8	44·6
ALL CASES	19·0	100·0	32·2	25·1	100·0	30·4

*M.D.S. of cases actually sent to C.D.

TABLE 79

Seasonal Variation with Respect to Certain Diseases : Relative Monthly Rates : British Army Other Ranks : Italy, 1944

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Coef. of Variation
Diphtheria	*a*	10·7	16·0	16·0	7·8	7·0	0·8	4·5	4·5	4·1	7·0	12·7	9·0	100	57·0
	b	16·7	15·6	14·0	8·9	5·3	3·1	4·3	3·5	3·3	7·4	9·9	8·0	100	56·6
Dysentery	*a*	5·3	4·1	4·0	3·2	5·7	17·4	22·3	10·5	11·3	8·5	4·5	3·1	100	70·8
	b	3·7	3·3	2·7	2·2	3·5	12·7	23·4	13·9	11·0	12·9	7·3	3·3	100	76·0
Infective Hepatitis	*a*	18·6	10·6	6·7	5·9	3·1	2·9	4·7	6·3	8·8	13·0	13·7	5·8	100	57·0
	b	16·4	11·2	5·9	4·8	3·5	3·0	3·9	5·3	9·5	13·9	13·2	9·4	100	53·2
Malaria	*a*	4·4	6·1	12·8	15·9	10·6	8·6	10·9	8·9	8·5	5·9	4·9	2·4	100	43·7
	b	3·1	5·0	9·1	13·8	12·2	10·0	11·6	12·3	7·9	6·7	5·0	3·2	100	43·8
V.D.	*a*	8·4	11·5	8·5	7·8	6·6	9·2	8·3	7·0	4·8	8·7	11·2	7·9	100	22·4
	b	10·1	9·6	9·2	9·2	7·9	7·9	8·3	8·0	6·3	6·8	8·6	8·2	100	16·1
Bronchitis	*a*	11·2	12·1	12·0	8·5	4·3	5·2	7·8	7·9	6·1	8·4	8·2	8·2	100	26·2
All Diseases	*a*	9·2	9·6	9·9	9·0	8·2	7·8	9·1	7·9	8·1	7·4	7·7	6·2	100	16·1
	b	8·6	8·3	8·2	8·5	8·1	8·8	11·0	9·1	7·5	7·4	7·9	6·6	100	15·4
All Accidents	*a*	8·1	7·3	8·2	7·6	8·5	10·1	10·0	10·1	7·5	6·3	7·7	8·6	100	16·4
Battle Casualties	*a*	12·0	16·9	8·7	5·7	12·1	8·3	8·0	3·6	12·4	5·5	3·1	3·8	100	

(*a*) Cases treated in hospital. (*b*) Cases treated in all medical units.

TABLE 80

Seasonal Fluctuation of Hospital Cases : Quarterly Relative Morbidity Rates with respect to certain Diseases : British Army Other Ranks : Italy, 1944

	Jan.—March	April—June	July—Sept.	Oct.—Dec.
Diphtheria	1·1	0·4	0·4	1·0
Dysentery	2·4	5·5	8·8	3·8
Infective Hepatitis	7·3	2·7	4·5	8·5
Malaria	12·0	20·6	16·8	9·0
V.D.	10·3	10·1	8·4	13·8
Bronchitis	2·4	1·3	1·7	2·3
All Diseases	100·0	100·0	100·0	100·0

§4 MORBIDITY IN ICELAND AND FAROES 1940-1944

ICELAND was occupied in June 1940. It was handed over to American forces in 1942, the British Troops being withdrawn in three main stages, in March, July and August of that year. At its peak strength the British Army garrison numbered just over 25,000 officers and other ranks. The Faroes were occupied at the same time, but with a very much smaller force, and some troops were kept there until late 1944. This force never exceeded 6,000 and, except during the year July 1942-June 1943, was seldom over 2,000. Information regarding hospitalized morbidity among these two garrisons is available from A.Fs. I1220 which were filed separately at the War Office and have been hand sorted for what follows. It is believed that rendering of A.F. I1220 was satisfactory. The small size of the forces employed and hence small number of cases of any individual disease do not justify detailed statistical analysis, and tables here given record only Relative Morbidity and Relative Casualty Rates, quarterly and annually w.r.t. Iceland and annually only w.r.t. Faroes.

One precaution must be observed in interpreting such rates. While the figures in Tables 81-84 refer only to hospitalized cases, there are several indications that conditions hospitalized in Iceland might have been treated in camp reception stations in the United Kingdom; and it is not certain that the threshold of hospitalization remained constant during the occupation. Thus the fact that SCABIES showed a high R.M.R. at the beginning and the end of the occupation may well be referable to administrative arrangements w.r.t. its treatment rather than to any epidemic fluctuation of its true incidence. With due regard to this proviso the following differences between vital statistics of Iceland and the United Kingdom call for comment:

(i) PSYCHIATRIC DISORDERS were relatively far less common both in Iceland and the Faroes than in the United Kingdom.

(ii) ACCIDENTAL INJURIES formed roughly the same constant proportion of all admissions in Iceland as in the United Kingdom. In the Faroes they were more common; but became relatively less so as the occupation progressed. This fact is probably referable to a large amount of construction work undertaken by the Army in the early days of the occupation.

(iii) If we regard all cases of urethritis as gonorrhoea, the relative contribution of the two principal VENEREAL DISEASES in northern climates (i.e. *gonorrhoea* and *syphilis*) is 2·2%, a figure which is well below the corresponding United Kingdom figure (6·5%) for 1943.

(iv) A high relative incidence of BALANITIS, associated with a high rate of operation for PHIMOSIS possibly encouraged by its prevalence, is possibly attributable to climatic conditions unpropitious to punctilious personal hygiene.

(v) The relative incidence of SINUSITIS is exceptionally high and is NOT associated with a conspicuously high incidence of *Otitis media and externa*.

Otherwise the general picture disclosed by these two tables does not differ greatly from that of §1 Part II. Table 84 shows *absolute* rates for all diseases and for all injuries; and corresponding rates for individual diseases are calculable by reference to the figures in Tables 82 and 83.

TABLE 81

(a) Relative Morbidity Rates

Iceland ; 1940-1942 ; R.M.R.s. and R.C.R.s. ; British Military Other Ranks

DISEASE	1940		1941				1942	
	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June
Tonsillitis and Pharyngitis	5·8	10·1	10·8	7·0	9·0	7·8	10·6	7·0
Bronchitis	9·4	9·9	7·8	6·5	5·1	7·0	6·2	4·6
Boils and Carbuncles	8·2	7·0	8·3	8·9	10·2	7·5	6·9	5·4
Impetigo	2·8	4·9	6·0	8·0	7·1	7·9	4·8	5·0
Dyspepsia and Gastritis	4·3	4·3	2·5	4·0	3·7	5·4	5·7	3·8
Influenza	5·8	1·9	5·9	0·5	1·2	1·0	1·6	2·7
Hernia	2·4	5·2	2·3	2·5	1·0	1·3	0·7	1·4
Rheumatic Conditions : Non Articular	4·3	2·5	2·4	3·6	2·3	5·7	4·0	4·5
,, ,, Articular	—	0·3	0·2	0·6	0·1	0·6	0·3	0·2
Appendicitis	3·9	2·6	2·8	3·0	2·9	2·3	0·8	2·2
I.D.K.	3·0	2·2	2·5	2·4	2·0	1·2	1·0	2·2
Scabies	5·4	5·4	0·1	—	0·1	2·2	2·3	7·8
Peptic Ulcers	2·3	1·1	2·1	2·0	3·3	2·2	1·9	1·3
Urethritis—All	2·1	2·1	1·4	1·5	3·8	1·6	1·5	1·1
All Psychiatric Disorders	1·5	1·6	2·0	1·5	2·0	2·1	3·1	2·2
Common Cold	0·6	1·1	2·3	2·0	2·0	3·0	2·1	3·4
Pneumonia	1·3	1·2	1·8	2·1	1·0	1·5	1·4	1·4
Otitis Media and Externa	1·7	1·6	1·2	1·9	2·6	2·7	1·5	1·1
Arthritis and Synovitis	1·1	0·9	1·1	2·3	1·7	1·4	1·6	0·6
Sinusitis	1·7	0·7	1·8	1·1	2·2	1·7	1·5	1·1
Diarrhoea, Enteritis and Food Poisoning	1·1	1·0	1·4	1·6	2·4	1·3	1·1	0·8
Haemorrhoids	1·1	1·0	0·7	2·3	1·0	0·7	0·6	2·1
Varicose Veins	0·6	1·1	0·8	1·5	1·5	3·0	2·7	2·6
Neoplasms	0·9	1·0	1·1	1·0	1·3	0·7	1·1	0·8
Tuberculosis : Pulmonary	0·2	0·7	0·9	1·3	0·5	0·8	1·3	1·0
,, Other	0·4	0·4	0·2	0·1	0·2	0·1	0·1	0·2
Balanitis	0·6	0·1	1·0	0·5	0·7	0·6	0·2	—
Syphilis	0·4	0·9	0·1	0·8	0·7	—	0·5	0·3
All Other Diseases	27·2	27·5	22·8	29·3	28·4	27·0	33·2	33·0
All Diseases	100	100	100	100	100	100	100	100
Number of Cases	*(466)*	*(810)*	*(995)*	*(796)*	*(886)*	*(1,095)*	*(1,057)*	*(625)*
(b) Relative Casualty Rates								
All Diseases	90·0	86·3	86·7	85·2	86·5	87·7	88·8	81·1
All Injuries	10·0	13·7	13·3	14·8	13·5	12·3	11·2	18·9

TABLE 82

Iceland ; 1940-1942 ; Annual R.M.Rs. and R.C.Rs. ; British Military Other Ranks

(a) Relative Morbidity Rates

DISEASE	July 1940-June 1941	July 1941-June 1942
Tonsillitis and Pharyngitis	8·9	8·8
Bronchitis	8·3	5·8
Boils and Carbuncles	8·1	7·6
Impetigo	5·8	6·3
Dyspepsia and Gastritis	3·6	4·8
Influenza	3·4	1·5
Hernia	3·1	1·1
Rheumatic Conditions : Non Articular	3·0	4·2
„ „ Articular	0·3	0·3
Appendicitis	3·0	2·0
I.D.K.	2·5	1·5
Scabies	2·3	2·7
Peptic Ulcers	1·9	2·3
Urethritis—All	1·7	2·0
All Psychiatric Disorders	1·7	2·4
Common Cold	1·7	2·6
Pneumonia	1·7	1·3
Otitis Media and Externa	1·6	2·1
Arthritis and Synovitis	1·3	1·4
Sinusitis	1·3	1·6
Diarrhoea, Enteritis and Food Poisoning	1·3	1·4
Haemorrhoids	1·2	1·0
Varicose Veins	1·0	2·5
Neoplasms	1·0	1·1
Tuberculosis : Pulmonary	0·8	0·9
„ Other	0·3	0·1
Balanitis	0·6	0·4
Syphilis	0·5	0·4
All Other Diseases	28·1	29·9
All Diseases	100	100
Number of Cases	(*3,067*)	(*3,663*)
(b) Relative Casualty Rates		
All Diseases	86·7	86·5
All Injuries	13·3	13·5

TABLE 83

Faroes ; 1941-1944 ; R.M.Rs. and R.C.Rs. ; British Military Other Ranks

(a) Relative Morbidity Rates

DISEASE	Oct. 1941-Sept. 1942	Oct. 1942-Sept. 1943	Oct. 1943-Sept. 1944
Common Cold	3·9	10·0	7·7
Boils and Carbuncles	12·7	10·0	6·8
Scabies	9·4	8·4	10·8
Tonsillitis and Pharyngitis	8·2	7·6	6·0
Bronchitis	6·4	4·3	2·3
Impetigo	1·5	3·8	4·5
Dyspepsia and Gastritis	4·9	3·7	4·8
Rheumatism : Non Articular	4·2	2·7	1·7
„ Articular	0·6	1·0	0·9
Diarrhoea, Enteritis and Food Poisoning	2·1	2·6	2·3
All Psychiatric Disorders	1·5	2·5	2·0
Urethritis—All	2·4	2·4	2·5
Appendicitis	0·6	2·4	2·6
Hernia	2·7	2·2	2·0
Arthritis and Synovitis	1·5	2·0	0·6
Varicose Veins	—	1·6	2·0
I.D.K.	0·6	1·1	2·6
Otitis Media and Externa	1·2	1·1	2·3
Haemorrhoids	1·8	1·0	2·6
All Other Diseases	33·3	29·6	32·9
All Diseases	100	100	100
Number of Cases	(*330*)	(*1,138*)	(*352*)

(b) Relative Casualty Rates

All Diseases	79·7	84·4	85·2
All Injuries	20·3	15·6	14·8

TABLE 84

All Hospital Admissions ; Iceland 1940-1942 and Faroes 1942-1943 ; Crude M.M.Rs. per 1,000 ; British Military Other Ranks

	ICELAND						FAROES			
	1940		1941		1942		1942		1943	
	All Diseases	All Injuries	All Diseases	All Injuries	All Diseases	All Injuries	All Diseases	All Injuries	All Diseases	All Injuries
January	—	—	18·1	2·8	15·0	2·1	—	—	20·1	2·7
February	—	—	19·5	3·2	20·4	2·2	—	—	29·2	3·0
March	—	—	19·0	2·8	21·0	2·8	—	—	20·1	3·0
April	—	—	13·6	2·9	19·9	3·4	—	—	15·9	2·8
May	—	—	13·0	2·3	11·6	4·3	—	—	16·8	5·2
June	—	—	14·6	2·1	16·3	3·9	—	—	14·0	3·0
July	2·5	0·9	12·8	2·3	—	—	—	—	17·0	4·5
August	15·5	2·0	13·3	2·1	—	—	—	—	17·4	4·5
September	17·9	1·3	11·5	1·5	—	—	—	—	20·3	3·0
October	17·2	2·7	12·9	1·8	—	—	10·6	3·1	—	—
November	18·4	2·4	18·8	3·0	—	—	13·6	2·8	—	—
December	12·3	2·7	15·9	2·0	—	—	13·6	1·0	—	—

§5 GROSS STATISTICS OF RARE DISEASES IN DIFFERENT THEATRES

IN presenting retrospective surveys of morbidity statistics of the Army during the War 1939-45 the principal aim in view has been an exposition of the major sources of wastage. Because such information bears witness to the success of army medical preventive measures, it is also of value to have at our disposal information with respect to (*a*) minor diseases which are still relatively common in the civilian populations of territories where British troops have had quarters; (*b*) relatively rare diseases at one time more common in the Army; (*c*) diseases which, though rare both among civilian and military personnel, are of special interest because they are often fatal or highly disabling.

Such are considerations which prompt selection of data in Table 85 based on analysis of hospital record cards (A.Fs. I1220) in the Central File of medical documents at the War Office. At the time of its preparation, this file had as yet received *no documents from the Far East*, medical record cards from A.L.F.S.E.A. being held in India. In view of documentary deficiencies attributable to loss through enemy action and uncertainties entailed in correctly relating such occasional occurrences to rapidly changing strengths, it would be wholly misleading to cite *absolute* rates in this context, especially as the main outcome is to indicate the comparatively trivial numbers of cases of most of the diseases cited. Evidently, the proportionate contributions of such trivial numbers can be disproportionately distorted when deficient by only a single case. The figures cited for Home Forces include some cases evacuated from overseas. On the other hand, there is a serious loss of cases of certain diseases owing to faulty rendering of documents by isolation hospitals in the United Kingdom. No figures for any female cases are given except in Home Forces. W.r.t. the Enteric group of Fevers, the Table includes both: (*a*) numbers of cases of *Typhoid* and the *Paratyphoids* explicitly accredited as such; (*b*) a group of cases designated generically as enteric fever without details of a pathological test.

With the exception of *Rheumatic Fever*, *Mumps*, *Measles* and *Chickenpox* in the United Kingdom, none of the diseases listed in Table 85 provides samples both sufficiently large and sufficiently homogeneous to permit an assessment of relevant therapeutic measures; but the following clinical particulars w.r.t. *Actinomycosis*, extracted from the hospital notes in a pilot survey with that end in view, may be worthy of separate comment on account of the rarity of the disease.

Of all cases (52) of Actinomycosis for which records were to hand, the details of only 38 were sufficiently explicit to provide information summarized below. Nine were shown discharged from the service and two others died. Information from other sources (A.F. B 3978) shows that 15 cases in all were discharged from the Service for this reason during the year 1943. The length of time symptoms were present before attending for treatment was stated in 23 cases, and in 21 non-pulmonary cases the duration was one month or less. In two pulmonary cases the times were 3 months and 12 months. In the remaining 15 cases where duration of symptoms was not specified, it was apparent from the records that the great majority had short histories. The majority of patients developed abscesses which required incision and major surgery was resorted to in all the abdominal cases; Hemicolectomy was performed in one and Ileotransverse anastomosis in another. Singly or in combination Iodides, X-rays, Sulphonamides and Penicillin were used as therapeutic measures. The three cases treated with Penicillin did not respond. (1·46 mega units in 10 days by three-hourly injections in one case and 300,000 units by intramuscular injection plus 32,000 units locally in another case). Sites of Infection are shown below:

ACTINOMYCOSIS

	No. of Cases
Head and Neck Region (28 cases, including 3 females)	
i. Tongue	1
ii. Face, other than lower jaw, without bone involvement	4
iii. Lower jaw region (*a*) probably dental origin	6
(*b*) associated with, but not apparently of dental origin	4
(*c*) no dental origin	3
iv. Cervical (*a*) with definite gland origin	5
(*b*) other	5
Abdominal (6 cases, including 2 females)	
i. R. Subphrenic abscess, origin unknown (died)	1
ii. R. Iliac Fossa abscess (1 case died), includes 2 cases with definitely affected appendix and caecum	4
iii. L. Psoas abscess (abdominal), origin unknown	1
Pulmonary (Symptoms were cough, sputum and small haemoptyses)	3
Ischio-Rectal Abscess	1
TOTAL	38

TABLE 85

Cases of Certain Minor and Rare Conditions; British Army

	U.K.			C.M.F.	M.E.F.	WEST AFRICA
	Sept. 1943 to Aug. 1944			Sept. 1943 to Aug. 1944	1944	Sept. 1939 to Dec. 1945
	Males	Females	Total	Males	Males	Males
Enteric Fever	2	—	2	62	24	1
Typhoid	8	—	8	133	105	5
Paratyphoid A	6	2	8	9	—	1
„ B	7	—	7	19	20	—
„ C	—	—	—	1	—	—
Undulant Fever	2	1	3	17	4	2
Abortus Fever	15	—	15	3	+	—
Rheumatic Fever	514	68	582	347	135	14
Subacute Bacterial Endocarditis	10	—	10	8	+	—
Measles	465	138	603	18	33	8
Mumps	641	142	783	105	48	19
Chicken Pox	583	125	708	111	50	33
Small Pox	2	1	3	82	102	—
Cerebro-spinal Fever	231	30	261	20	1	3
Poliomyelitis	37	3	40	53	+	—
Actinomycosis	12	2	14	5	+	—
Leprosy	—	—	—	1	+	—
Encephalitis Lethargica	4	1	5	6	+	—
Tetanus	—	—	—	5	—	—
Leishmaniasis....	44	—	44	56	39	6
Psittacosis	—	—	—	—	+	1
Ratbite Fever	1	—	1	1	+	—
Typhus, Tickborne	—	—	—	—	+	—
Trench Fever	1	—	1	—	+	—
Weil's Disease	13	—	13	2	+	—
Relapsing Fever	—	—	—	10	9	—
Trypanosomiasis	—	—	—	—	+	2
Yellow Fever	—	—	—	—	+	3
Schistosomiasis	4	—	4	—	6	206
Cysticercosis	9	—	9	1	+	1
Echinococcosis	4	—	4	1	+	1
Ankylostomiasis	9	—	9	2	8	16
Filariasis	1	1	2	—	+	—
Dracontiasis	—	—	—	—	+	1

— No cases reported. + Figures not available.

Part IV. HEALTH OF COLONIAL TROOPS

§1 WEST AFRICA, 1941-1944

IN so far as Army Medical Services have responsibilities for troops of African or of Asiatic origin, it is a matter of some importance to clarify relative frequency and gravity of different diseases among personnel of different ethnic groups. What follows in this section summarizes data embodied in the *Annual Statistical Report* 1944 prepared by the A.D.H. West African Force with special reference to the relative importance of diseases among United Kingdom military personnel and African indigenous troops. Except in so far as they refer to V.D., the figures are based solely on *hospital* admissions.

It is necessary to state emphatically that available sources of information do NOT justify the assumption that the ethnic group differentials disclosed by the ensuing tables have their origin in NATURE AS OPPOSED TO NURTURE. The two populations at risk, respectively of European and African stock, have reached maturity in widely different types of environment, exposed to different sources of infection with concomitantly different degrees of acquired immunity, reared in different climates and accustomed to very different regimens of diet. We have no precise information about the age composition of indigenous African military personnel; but from what we do know about the expectation of life on the African continent, we can be fairly confident that the age composition of indigenous African military personnel is widely different from that of United Kingdom troops. We may also assume with some justification that criteria of selection and rejection at enlistment differ appreciably. For all these reasons, observed differences here recorded justify no conclusions about inborn differences with respect to natural immunity. What they do show is which diseases are for one reason or another of GREATER OR LESS CONCERN TO ARMY MEDICAL POLICY *vis a vis* its respective responsibilities for the health of British troops in West Africa and for the health of locally recruited forces of indigenous origin. To avoid continual periphrasis, the terms European and African in what follows, respectively refer to these two personnel categories.

Table 86 shows that the total sickness rate of Europeans has been consistently higher than that of Africans, being initially (1941) more than twice as high and finally (1944) about 30% higher. During this period the admission rate of Europeans has steadily fallen while that of Africans has fluctuated without any characteristic trend. The reason for both these differences is one and the same, namely, successful *control of MALARIA*. This is evident from the fact that the European figures record no steady improvement if we exclude malaria and differ very little from the corresponding figures for Africans. The overall invaliding (*vide infra*) rates for Europeans (Table 87) have been about one and a half times as high as for Africans.

Table 88 shows the comparative importance of different diseases as judged by the frequency of their occurrence. The diseases to which Africans are relatively immune are MALARIA, BACILLARY DYSENTERY, AMOEBIC DYSENTERY. The diseases to which African troops are specially prone are V.D., PNEUMONIA, CHICKEN-POX, and TROPICAL ULCER. These differences are not unexpected. What is surprising in the light of experience in other theatrès is that the Tuberculosis rates for Europeans in an alien environment and for Africans *in their native habitat* tally closely. The high European figure for Schistosomiasis is due largely to a local outbreak in Nigeria.

Table 89 exhibits a gratifying sequence showing the successful control of MALARIA among both European and African troops, a conclusion dramatically reinforced by subsequent figures for 1945, when the rate for Europeans was one tenth that of 1941. An arresting feature of the table is the relatively small reduction in Nigeria and the relatively large reduction in Sierra Leone. The latter is partly due to a high initial rate at a time when a large number of " raw troops went straight to hastily prepared camps and to jungle and night training ". The figures in this table should be read in juxtaposition to the information with respect to suppressives employed shown at the foot of the table. After an initial rise in 1942 the number of cases of BLACKWATER FEVER (Table 90) per 1,000 cases of malaria among Europeans has shown a spectacular decline throughout the command.

Table 91 summarizes available information with reference to DYSENTERY, the incidence of which has declined during the last three years. The ratio of *bacillary* to *amoebic* dysentery has been much higher in Sierra Leone and Nigeria than in Gold Coast and the Gambia.

During the period under discussion the overall rate for VENEREAL DISEASES has risen greatly among European troops and during the last year among Africans also. Among Europeans the rise has been most conspicuous in Nigeria where the African rate is high compared with the Command as a whole. The relative frequencies of the several Venereal Diseases exhibit a striking differential in Table 93. The proportionate contribution of GONORRHOEA to total V.D. among Africans is high as compared with the corresponding figure for Europeans, that of SYPHILIS being low. The proportionate contribution of SOFT CHANCRE to total V.D. among Europeans is very high as compared with the corresponding figure for Africans. It is clear that V.D. control is the outstanding problem of Army preventive medicine in West Africa, more especially in relation to the indigenous population.

Tables 88 to 93 indicate the relative importance of the various diseases in so far as frequency of *hospitalization* is the criterion of importance. Table 94 displays the importance of various diseases as judged by their proportionate contributions to discharge from the Service on medical grounds (Africans) and evacuations to United Kingdom (Europeans). So far as concerns Africans, the most noteworthy features are the high proportionate contributions of V.D., TUBERCULOSIS and YAWS. The proportionate contribution of Yaws fell steeply in 1944; but it is difficult to assess how far this indicates a positive trend.

As regards Europeans, the most striking feature of Table 94 is a 50 per cent. drop in the proportionate contribution of chronic MALARIA and BLACKWATER FEVER in 1944 as compared with 1943.

Table 95 exhibits the proportionate contribution of different diseases to all deaths from disease. From this point of view BLACKWATER FEVER and MALARIA have first place among Europeans, PNEUMOCOCCAL INFECTIONS and TUBERCULOSIS among Africans. It is pertinent to stress the high contribution of tuberculosis to deaths among Africans in view of the fact that the hospital admission rates for T.B. among Europeans and Africans differ very little.

Summary

Broadly speaking, we may thus say that the major diseases in West Africa 1941-44 have been:

(*a*) *vis a vis* European troops MALARIA and BLACK-WATER FEVER, DYSENTERY and V.D.;

(*b*) *vis a vis* Africans V.D., PNEUMOCOCCAL INFECTIONS, CHICKEN-POX, YAWS, and TUBERCULOSIS.

The outstanding positive achievements of Army Medicine in W. Africa have been control of MALARIA (and Black-water Fever), of DIETETIC DEFICIENCY DISEASES, possibly also of YAWS. On the other hand the present prevalence of V.D., DYSENTERY, TUBERCULOSIS and PNEUMONIA provides no grounds for complacency.

TABLE 86

Hospital Admissions—all causes; Rates per 1,000 strength per year; 1941-1944

(*a*) Europeans

Year	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command	
					All Causes	Excluding Malaria
1941	1,737	968	1,804	942	1,620	698
1942	1,585	907	1,583	1,852	1,436	680
1943	1,432	1,186	1,017	1,161	1,157	726
1944	1,029	1,332	677	826	1,105	827
(*b*) Africans						
1941	877	372	1,400	500	632	561
1942	811	409	897	881	721	648
1943	733	654	656	803	663	621
1944	950	1,032	421	852	851	806

TABLE 87

Invaliding rates per 1,000 strength per year; 1941-1944

(*a*) Europeans (Evacuations to U.K.)

Year	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command
1941....	53	131	91	76	96
1942....	44	95	69	54	70
1943....	36	62	55	55	59
1944....	44	116	67	75	85
(*b*) Africans					
1942....	59	51	25	25	44
1943....	51	43	23	21	37
1944....	52	62	18	34	46

TABLE 88

Admissions to Hospital with respect to Certain Infectious Diseases; Rates per 1,000 strength per year; 1944

	(*a*) Europeans	(*b*) Africans	Ratio (*a*)÷(*b*)
Malaria	278·0	45·0	6·2
Venereal Disease	81·2*	386·0*	0·2
Bacillary Dysentery	65·2	4·6	14·2
Amoebic Dysentery	26·0	4·9	5·3
Schistosomiasis....	24·3	19·4	1·3
"Jaundice"	7·2	3·5	2·1
Tuberculosis	2·7	2·6	1·0
Pneumonia	1·9	21·4	0·1
Chickenpox	—	17·8	—
Tropical Ulcer	—	8·7	—
Trypanosomiasis	—	1·6	—
C.S.F.	—	1·4	—
Smallpox....	—	0·2	—
Enteric Fevers	—	0·2	—

*This figure includes cases treated in units.

TABLE 89

Admissions to Hospital for Malaria 1942-44 as Percentage of Admissions in 1941

Year	Europeans					Africans
	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command	Whole Command
1941	100·0	100·0	100·0	100·0	100·0	100·0
1942	86·9	93·1	76·6	161·2	85·1	102·8
1943	46·0	81·9	37·6	73·0	49·4	59·2
1944	24·3	70·7	6·9	26·4	31·1	63·4

Suppressives Employed

January 1941 to March 1943 .... Quinine grs. V daily.
March 1943 to August 1943 .... Mepacrine 0·4 gm. per week.
August 1943 to May 1944 .... Mepacrine 0·6 gm. per week.
May 1944 to December 1944 .... Mepacrine 0·7 gm. per week.

TABLE 90

Number of cases of Blackwater Fever per 1,000 cases of Malaria ; Europeans ; 1941-1944

Year	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command
1941	8·4	11·5	3·5	16·0	6·0
1942	13·0	23·0	5·0	8·0	13·0
1943	11·0	10·0	6·0	8·0	9·0
1944	1·5	0·5	—	—	1·0

TABLE 91

Admissions to Hospital for Dysentery (all causes) ; Rates per 1,000 strength, and proportion of Bacillary to Amoebic Dysentery ; Europeans ; 1941-1944

Year	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command
1941	28	25	46	117	51
1942	21	45	85	53	71
1943	28	42	49	51	42
1944	36	13	24	56	27
Bacillary : Amoebic 1941-1944	1 : 1	4 : 1	6 : 1	1 : 1	2 : 1

TABLE 92

Incidence of Venereal Disease (all types) per 1,000 strength per year, 1941-1944

(*a*) Europeans

Year	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command
1941	71·4	37·2	52·2	23·5	51·6
1942	62·3	47·8	41·8	16·2	45·3
1943	64·8	105·9	39·1	20·7	69·4
1944	68·6	110·2	46·4	21·9	81·2
(*b*) Africans					
1942	319	475	172	86	314
1943	300	359	196	102	296
1944	419	477	280	120	386

TABLE 93

Breakdown of Venereal Diseases, 1944

(*a*) Europeans

	Gold Coast	Nigeria	Sierra Leone	Gambia	Whole Command
Syphilis....	8·4	4·1	18·0	23·0	6·3
Gonorrhoea	72·8	59·2	70·0	61·5	64·4
Lymphogranuloma	7·0	8·8	3·6	—	9·3
Chancroid	11·8	27·9	8·4	15·5	20·0
Total	100·0	100·0	100·0	100·0	100·0
(*b*) Africans					
Syphilis....	2·3	2·1	1·3	8·5	1·7
Gonorrhoea	76·6	92·0	94·0	65·0	88·2
Lymphogranuloma	11·3	3·5	3·5	—	5·6
Chancroid	9·8	2·4	1·2	26·5	4·5
Total	100·0	100·0	100·0	100·0	100·0

TABLE 94

Relative Causes of Evacuation to U.K. (Europeans) and Invaliding (Africans)

	Europeans (Evacuation to U.K.)		Africans (Invaliding)		
	1943	1944	1942	1943	1944
Chronic Malaria and Blackwater Fever	22·4	11·1	* * *	* * *	* * *
Nervous and Psychiatric Disorders (*a*)....	18·5	17·6	—	—	11·5
E.N.T. Diseases	6·8	7·6	* * *	* * *	* * *
Accidents	5·3	5·9	* * *	* * *	* * *
Tuberculosis	4·8	3·8	6·8	6·8	10·4
Amoebic Dysentery	1·5	7·6	* * *	* * *	* * *
Venereal Disease	0·8	0·3	5·7	5·7	4·3
Yaws	* *	*	25·2	25·1	4·3
Guinea Worm	* *	*	5·9	5·9	1·1
Leprosy....	* *	*	2·3	2·4	4·8
Other Causes	39·9	46·1	54·1	54·0	61·5
Total	100·0	100·0	100·0	100·0	100·0

(*a*) There are no satisfactory records of African psychiatric cases invalided during 1942 and 1943

* less than 0·2%   * * less than 0·5%   * * * less than 1·0%

TABLE 95

Relative Causes of Deaths ; Percentages of Total Deaths due to Disease and Rank of each Item, 1941-1944

	Percentage		Rank	
	Europeans	Africans	Europeans	Africans
Blackwater Fever	36·20	0·45	1	15
Malaria	13·49	0·83	2	13
Pneumonia	4·91	—	3	—
Pneumococcal Infections	—	17·07	—	1
Staphylococcal Infections	4·29	7·70	4	4
Neoplasms	3·68	4·46	5	6
Infective Hepatitis	3·07	6·42	6	5
Heat Exhaustion	2·46	0·98	7	12
Nephritis	2·45	3·85	8	7
Encephalitis	2·45	1·21	9	11
Smallpox	1·84	1·66	10	10
Tuberculosis	1·23	13·22	11	2
Bacillary Dysentery	1·23	3·25	12	8
Streptococcal Infections	1·23	2·11	13	9
Meningococcal Infections	—	10·80	14	3
Vitamin Deficiencies	—	0·83	15	14
Others	21·48	25·16	—	—
Total	100·00	100·00	—	—

§2 MEDICAL ETHNOGRAPHY OF THE C.M.F., 1944

IN so far as information is available, the ensuing analysis covers the risks of different personnel categories to disease amongst troops in C.M.F. during 1944. For purposes of comparison certain figures relating to British troops in North Africa in 1943 also appear. Data come from weekly hygiene reports submitted to the War Office by A.F.H.Q. There is reason to hope that figures available w.r.t. total strengths are as accurate as need be; but it has not been possible to obtain a reliable breakdown w.r.t. strength by commands. It is therefore possible only to split troops stationed in North Africa from those in Italy and Sicily; and it is not possible to eliminate differences arising from differential location within these two regions. Thus a high proportion of troops of a given nationality stationed in a malarial district will lead to an exaggerated assessment of susceptibility of such troops to this disease; and similar remarks apply *mutatis mutandis* to others. This note of caution is relevant in greater or less degree to any conclusions tentatively advanced below.

Relative rates in Tables 96 and 99 show what contribution a specific disease or group of diseases makes to total casualties or to all casualties of a particular class w.r.t. any type of personnel. Thus they do not take account of *absolute* incidence (i.e. incidence per 1,000 strength), as do those in Tables 97, 98 and 100 which cite *comparative rates*. Their usefulness depends on the fact that errors w.r.t. strength or deficiencies of rendition do not presumably affect their value as sample estimates. Hence conclusions equally attested by reference to relative and comparative rates are likely to be valid with due regard to the limitations set forth in the preceding paragraph. Main differences between statistics w.r.t. disease among British troops in North Africa in the two successive years, as shown in the first two columns on the left of Table 99, are such as might arise through change from active to static conditions: a sharp rise of V.D. and sharp fall of Dysentery. In Tables 97, 98 and 100 the rate per 1,000 troops per year w.r.t. British troops in Italy and Sicily is taken as 100 and the annual rates per 1,000 w.r.t. other personnel appear proportionately thereto. It is thus possible to compare *actual* loss to any force caused by a specific disease with the corresponding figure for British troops in Italy and Sicily on account of the same disease.

For purposes of comparison with medico-ethnographical data available w.r.t. M.E.F. and W. Africa, those supplied by C.M.F. hygiene reports are defective in so far as it is not possible to assess relative and comparative gravity of diseases in terms of mortality. Our only information shown in Table 98 is to the effect that the overall death rate w.r.t. disease and accidents is low among Canadians (32% below United Kingdom standard in Italy and Sicily) and high among Indian troops (79% higher). Mortality w.r.t. disease and accidents taken together among British troops in N. Africa was roughly 40% higher than among British troops in Italy and Sicily. On the other hand, the contribution of mental and nervous diseases among British troops in N. Africa is relatively (Table 96) and absolutely (Table 97) lower than among British troops in Italy and Sicily, and this fact is at least partly explicable in terms of the sufficiently familiar association of battle casualties with psychiatric breakdown. Among troops of different local origin stationed in Italy and Sicily, Indian troops have a relatively and absolutely lower rate for mental and nervous disorders than British troops, Africans a higher. Africans also have higher battle casualty rates. With regard to psychiatric disorders it is notable that a low level among Indian troops is associated with a very high level *both* of battle casualties and of self-inflicted wounds.

The breakdown of MALARIA w.r.t. type of primary attack and relapse (or reinfection) in Tables 99 and 100 shows that the *overall* relative and absolute rates for British troops alone and for all troops in Italy and Sicily are lower than for British troops in N. Africa; but there is little difference w.r.t. *primary* attacks. Cases of quartan malaria were concentrated in N. Africa, and the figures for Italy (including Sicily) are too small to permit comparison w.r.t. personnel categories. The fact that primary B.T. rates of Africans are much less and primary M.T. greater than those of British troops in Italy and Sicily, as also the fact that Indian rates for both are lower may merely reflect differences with respect to location of troops of different local origin. That total V.D. rates for Indians are 48% lower than for British troops in Italy and Sicily may be partly due to such circumstances; but the higher figure for Africans tallies broadly with experience in the M.E.F. where the standardized rate for Africans is over four times as high as that for British troops. W. African figures cited in § 1 show that the frequencies of gonorrhoea and syphilis for British and African troops were respectively in the ratios 10 : 1 and 52 : 1. For Italy and Sicily ratios are 7 : 1 and 5·7 : 1. With respect to other communicable diseases, it is noteworthy that Sandfly Fever was much more prevalent among British troops in Italy and Sicily than among British troops in N. Africa, where the general level of morbidity was lower. No comparison between figures for Dominion troops in C.M.F. and M.E.F. is possible since the bulk of those in M.E.F. were U.D.F. (including non-European troops) and those in C.M.F. were Canadians (exclusively of European stock). If we disregard the influenza rate on the ground that its value is highly prejudiced by uncertainty w.r.t. diagnostic criteria, the notable features of Canadian morbidity are the very high rates for INFECTIVE HEPATITIS and for the ENTERIC GROUP. The high rate w.r.t. catarrhal jaundice exceeds what might reasonably be expected as a consequence of any differences w.r.t. age composition of the United Kingdom and Canadian armies. The N.Z.E.F. rates for these diseases are also high, as also for DYSENTERIES, PNEUMONIA and HELMINTHIASES. The figures for N.Z.E.F., be it noted, refer both to troops of European stock and to Maoris. As regards troops of non-European stock there is one conspicuous feature common to data available w.r.t. M.E.F. and figures in Tables 99 and 100, viz. that Africans and Indians, more particularly the latter, appear to be less liable to DIPHTHERIA. As also in M.E.F. the incidence of T.B. rates is high among both; and the incidence of Sandfly Fever is much lower among Indian than among British troops. In the absence of confirmatory evidence from the M.E.F., however, the significance of this would be open to doubt without basic data for standardization of morbidity rates w.r.t. differential local risk, particularly in view of the still lower crude incidence of Sandfly Fever among Canadian troops.

Summary (*See* Chart 18). Data available w.r.t. C.M.F. 1944 do not permit us to make due allowance for differential geographical distribution of troops of different local origin.

(*a*) With due regard to this limitation they tally with more reliable data from M.E.F. in so far as Indian and African troops were conspicuously less liable to DIPHTHERIA and more liable to TUBERCULOSIS than troops of European stock.

(*b*) Canadian and New Zealand troops were exceptionally liable to INFECTIVE HEPATITIS.

TABLE 96 **Relative Casualty Rates of Cases admitted to All Medical Units**

	N. AFRICA	ITALY AND SICILY						N. AFRICA ITALY & SICILY
	British	British	Canadian	New Zealand	Indian	African	Total	Grand Total
Nervous and Mental Disorders (incl. Exhaustion)	2·7	4·9	5·0	4·9	3·6	8·1	4·9	4·8
Diseases of Skin	6·6	6·3	5·5	7·3	8·3	5·4	6·3	6·4
I.A.T.	5·4	7·4	6·3	8·2	10·1	8·5	7·4	7·3
All Other Diseases	85·3	81·4	83·2	79·6	78·0	78·0	81·4	81·5
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Diseases	92·6	78·2	74·5	69·9	52·3	68·1	75·0	75·9
Injuries : Battle Casualties	0·1	14·9	17·9	19·1	35·3	16·9	17·2	16·3
Accidental	6·6	5·8	6·1	9·4	10·9	13·8	6·7	6·7
Self-inflicted	0·0	0·0	0·2	0·0	0·2	0·0	0·1	0·1
Burns	0·7	0·9	1·3	1·6	1·2	1·2	1·1	1·0
ALL ADMISSIONS	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 97 **Comparative Casualty Rates of Cases admitted to all Medical Units**

	N. AFRICA	ITALY AND SICILY						N. AFRICA ITALY & SICILY
	British	British	Canadian	New Zealand	Indian	African	Total	Grand Total
Nervous and Mental Disorders (incl. Exhaustion)	41	100	156	161	61	181	107	101
Diseases of Skin	76	100	132	185	108	94	106	104
I.A.T.	53	100	130	179	114	127	107	102
All Other Diseases	76	100	157	158	80	105	106	104
ALL DISEASES	73	100	153	161	83	110	107	103
Injuries : Battle Casualties	0	100	192	230	294	143	128	116
Accidental	69	100	169	291	233	298	127	122
Self-inflicted	50	100	1,050	100	900	200	250	250
Burns	48	100	217	308	163	155	125	117
ALL ADMISSIONS	61	100	161	180	124	126	111	107

TABLE 98 Comparative Casualty and Mortality Rates (excluding Battle Casualties)

	N. AFRICA	ITALY AND SICILY						N. AFRICA ITALY & SICILY
	British	British	Canadian	New Zealand	Indian	African	Total	Grand Total
Admissions to All Medical Units (excl. B.C.)	72	100	155	172	95	123	108	105
New Cases Reporting Sick....	139	100	107	129	89	90	101	104
Deaths in All Medical Units (excl. B.C.)....	139	100	68	87	179	109	102	106

TABLE 99 Relative Morbidity Rates of Cases admitted to all Medical Units ; 1943 and 1944

	1943	1944							
	N. AFRICA	N. AFRICA	ITALY & SICILY						N. AFRICA ITALY & SICILY
	British	British	British	Canadian	New Zealand	Indian	African	Total	Grand Total
Malaria : Primary B.T.	5·9	7·5	5·7	3·9	0·7	2·1	2·0	4·9	5·0
„ Q	0·0	0·1	0·0	—	—	0·0	—	0·0	0·0
„ M.T.	2·2	0·6	0·2	0·1	0·0	0·2	0·4	0·2	0·2
„ Clinical	5·4	0·8	1·2	1·3	0·1	0·3	0·4	1·1	1·1
Relapse (all types)	1·0	10·4	6·7	1·5	0·2	2·2	1·4	5·2	5·6
All	*14·6*	*19·4*	*13·8*	*6·9*	*1·1*	*4·9*	*4·2*	*11·4*	*11·9*
V.D. : Gonorrhoea	1·7	4·4	5·0	4·6	2·7	2·5	8·6	4·8	4·8
Syphilis	0·3	0·6	0·7	0·6	0·3	0·9	1·5	0·7	0·7
Others	1·4	2·8	4·1	3·6	3·5	2·7	5·5	4·0	3·9
All	*3·4*	*7·8*	*9·9*	*8·7*	*6·6*	*6·1*	*15·5*	*9·5*	*9·4*
Jaundice : Infective Hepatitis	5·5	3·7	4·9	11·4	20·8	3·5	4·4	6·6	6·4
Post-arsphenamine	0·1	0·1	0·1	0·0	0·0	0·1	0·2	0·1	0·1
Dysenteries	6·3	1·7	2·3	1·1	2·9	2·9	2·8	2·2	2·2
Diphtheria	0·8	1·7	0·9	1·0	0·8	0·1	0·3	0·8	0·9
Pneumonia : Pneumococcal	0·1	0·2	0·4	0·2	1·7	0·3	0·4	0·4	0·4
Other Causes	0·2	0·3	0·3	0·3	0·5	0·4	0·4	0·3	0·3
All	*0·3*	*0·5*	*0·7*	*0·4*	*2·2*	*0·7*	*0·8*	*0·7*	*0·7*
Influenza	0·1	0·4	0·2	1·3	0·5	0·4	0·5	0·4	0·4
Sandfly fever	0·1	0·0	0·5	0·0	0·2	0·3	0·4	0·4	0·4
Enteric Group	0·1	0·1	0·1	0·7	0·2	0·1	0·0	0·2	0·2
T.B. (all types)	0·1	0·2	0·1	0·0	0·1	0·8	0·6	0·2	0·2
Helminthic Diseases	0·0	0·0	0·0	0·1	0·3	0·8	0·0	0·1	0·1
Food poisoning	0·0	0·1	0·1	0·0	0·0	0·3	0·5	0·1	0·1
All Other Diseases	68·6	64·3	66·4	68·4	64·3	79·0	69·8	67·3	67·0
ALL DISEASES	**100·0**	**100·0**	**100·0**	**100·0**	**100·0**	**100·0**	**100·0**	**100·0**	**100·0**

TABLE 100

Comparative Morbidity Rates of Cases admitted to All Medical Units

	N. AFRICA	ITALY & SICILY						N. AFRICA ITALY & SICILY
	British	British	Canadian	New Zealand	Indian	African	Total	Grand Total
Malaria: Primary B.T.	97	100	106	20	30	39	92	92
„ Q	686	100	—	—	—	29	71	129
„ M.T.	163	100	80	4	75	156	94	101
„ Clinical	46	100	162	16	22	39	97	92
Relapse (all types)	113	100	35	6	28	23	83	86
All	*102*	*100*	*76*	*12*	*29*	*33*	*88*	*89*
V.D.: Gonorrhoea	64	100	140	88	42	188	102	98
Syphilis	58	100	123	75	104	224	105	101
Others	50	100	132	136	54	145	102	98
All	*58*	*100*	*136*	*107*	*52*	*172*	*102*	*98*
Jaundice: Infective Hepatitis	54	100	353	677	59	98	142	130
Post-arsphenamine	48	100	16	7	73	149	88	84
Dysenteries	54	100	76	202	106	134	102	98
Diphtheria	140	100	163	135	6	34	100	103
Pneumonia: Pneumococcal	38	100	85	776	82	133	119	112
Other Causes	63	100	116	256	90	116	106	102
All	*51*	*100*	*100*	*526*	*86*	*125*	*113*	*108*
Influenza	124	100	967	354	148	235	204	197
Sandfly Fever	1	100	13	68	46	94	86	78
Enteric Group	38	100	791	256	32	38	170	159
T.B. (all types)	110	100	48	73	589	560	138	136
Helminthic Diseases	76	100	238	1,329	1,757	33	267	248
Food Poisoning	96	100	70	30	230	626	116	114
All Other Diseases	71	100	158	157	99	116	108	105
ALL DISEASES	73	100	153	161	83	110	107	103

§3 MEDICAL ETHNOGRAPHY OF THE MIDDLE EAST, 1943

DATA of the ensuing section have been extracted from the 1943 Annual Hygiene Report of the Medical Statistical Section, G.H.Q., M.E.F., the documentary source being A.Fs. A31 (*mod.* M.E.F.) rendered monthly to Commands for hospital admissions. This return was primarily designed for immediate needs of local hygiene administration. Hence the classification of diseases is less refined than one might wish for the purpose in hand. In so far as differentials here disclosed might prompt speculation with reference to the relative contributions of nature and nurture, it is necessary to repeat a *caveat* already stated in the survey of material from West Africa. The categories of personnel dealt with are products of different environments from conception to the date of enlistment, or rather of service in the theatre. No information as yet at our disposal entitles us to say how far differences of diet, exposure to infection, and other environmental agencies contribute to observed differences with respect to disease susceptibility.

Strengths used were obtained through Medical Directorate channels by Medical Statistical Section 02 E. The statistical section at G.H.Q., Cairo, undertook a special enquiry to estimate the extent of error involved, and found that it was trivial *vis-a-vis* our present purpose. D.D.H., M.E.F., supplied useful corroborative information. Consequently, we are in a position to avoid a pitfall of interpretation already exposed by local variations w.r.t. medical statistics of West Africa, *i.e.*, unequal distribution of personnel categories in different localities. Thus 57% of Indian troops were in one command (*Egypt*, *Cyrenaica* and *Tripolitania*), in which Dominion troops had 94% of their strength (Table 101). This would not matter if the risks were evenly distributed; but Table 102, which refers to United Kingdom troops alone, shows that risks of exposure to disease vary widely in different commands. By far the highest relative incidence of malaria among United Kingdom troops occurs in Sudan and Eritrea. Other things being equal, a group with a large proportion of its personnel stationed in this command would thus be expected to have a higher malaria rate. Of itself, this circumstance is not a fatal obstacle to valid comparison, if reliable basic information is available with reference to:

(*a*) separate strengths of each personnel category in each command;

(*b*) separate admission rates to medical units in each command.

Given these data, we can either:

(i) calculate what the over-all morbidity of one personnel category would be if its proportionate distribution between commands were the same as that of another, taken as the standard of comparison; or

(ii) confine comparison to one and the same locality.

Figures comparable to those in Table 102 are not available for separate personnel categories other than United Kingdom, but are available for all categories taken together. Thus comparison confined to one and the same command as suggested in (ii) above is not practicable. The procedure indicated in (i) above, though novel in application, is identical in principle with the accepted method of age-standardization, *i.e.*, adjustment of figures to take account of differences with respect to age composition and the different risks associated therewith. The method of computation of appropriate *locality-standardizing* factors therefore calls for no exposition.

For M.E.F. 1943 we have separate figures with reference to over-all morbidity and mortality by diagnosis for 4 personnel categories, *viz.*: United Kingdom; Dominion forces (largely U.D.F., containing a considerable proportion of non-European stock); Indian troops; and British Africans, at that time mostly Swazis, Basutos and Bechuanas. As a yardstick of local risk, we also have figures (Table 102) for disease incidence of United Kingdom troops in different commands. By combining the information in Tables 101 and 102 we can compute locality-standardizing factors to adjust the over-all rates of remaining personnel categories with respect to any disease. Figures so adjusted are those referred to under *standardized rate A* in Tables 104 to 106. The implicit assumptions are that:

(*a*) the strength figures in Table 101 are tolerably reliable for the present purpose (*see above*);

(*b*) the command differentials with reference to United Kingdom troops truly reflect differential risk of exposure.

It is arguable that comparable figures for *all* personnel categories taken together would provide a better criterion of local risk than those of Table 102. For that reason we have computed alternative standardization factors on that basis. Figures adjusted by recourse to these are those referred to as *standard rates B*. Though admission rates for individual diseases classified with respect to local origin of personnel differ widely, the distribution of totals hospitalized (Table 103) does not appreciably deviate from the corresponding strength distribution. Tables 104-5 exhibit the relative importance of different individual diseases and certain groups within one and the same category of personnel. Among outstanding features disclosed are:

(*a*) as compared with troops of European and of African stock, Indians were especially prone to MALARIA and to EYE DISEASES;

(*b*) as compared with troops of European and of Asiatic stock, Africans were especially prone to DYSENTERY and to PNEUMONIA, being less prone to MALARIA and to SKIN diseases;

(*c*) as compared with non-Europeans, troops of European stock appear to have been especially prone to E.N.T. diseases;

(*d*) troops of United Kingdom domicile were relatively less prone to V.D. than others of predominantly European stock, and troops of Asiatic origin were relatively less prone to V.D. than Africans.

The expression *more or less prone* in the above signifies more or less prone to a given disease *relative to all others*. Table 106 based on *absolute*, as opposed to relative, rates, presents morbidity data in another way, emphasizing the foregoing conclusions and bringing into sharper relief others, namely:

(*a*) troops of United Kingdom domicile were much less prone to TUBERCULOSIS, BILHARZIASIS and MUMPS and much more prone both to INFECTIVE HEPATITIS and to DIPHTHERIA than were other troops whether mainly of European stock or not;

(*b*) troops of Asiatic and of African stock were more prone to BRONCHITIS than were troops of European stock.

(*c*) troops of Asiatic stock were conspicuously less prone than others to DIPHTHERIA.

The relatively high malaria rate among Indian troops clearly prompts further enquiry into susceptibility differences with respect to different Plasmodium types or local varieties of one and the same type. The low rate of *infective hepatitis* among *Dominion* troops is not to be taken as characteristic of all such. They were almost exclusively made up of N.Z.E.F. and U.D.F. The latter were a majority, and the low susceptibility of S. African troops as opposed to N.Z.E.F. is responsible for this differential. Without more precise information concerning how far troops of non-European stock contribute to U.D.F.

during the period covered, it is not possible to assess its significance *vis-a-vis* the contributions of nature and nurture. If we were entitled to assume that the proportion of troops of Non-European stock in the Dominion forces was too small to influence the results recorded, Tables 104 to 106 would disclose striking examples of differences associated with local domicile rather than with ancestral stock. There would then be a presumptive case for the view that early environment as opposed to inborn peculiarities contributes largely to the group differentials here recorded.

Data submitted by A.D.H., West Africa, as summarized in § 1 above made it possible to assess ethnic group differentials with respect to relative gravity of, as opposed to relative susceptibility to, individual diseases. The right hand half of Table 107 and that of Table 108, exhibit similar data for M.E.F. 1943. Here *fatality* stands for the ratio of deaths to hospital admissions with respect to one and the same diagnostic category. *Relative mortality* (left hand half) signifies the ratio of deaths from each disease cited to deaths from sickness of all kinds. The salient features shown in the right hand are:

(*a*) as compared with troops of European stock, relatively high fatality among *African* troops of ENTERIC FEVER and TUBERCULOSIS and TYPHUS;

(*b*) as compared with troops of European stock, relatively high fatality among *Indian* troops of TUBERCULOSIS.

The provisional conclusions expressed in the foregoing summary serve to emphasize the desirability of:

(i) separately recording figures by commands for different localities where risks are different;

(ii) securing reliable strength figures by locality for each personnel category;

(iii) explicitly specifying all categories of personnel for which figures are available.

The introduction of Army Form W3166 at the end of the war, was in part motivated by these considerations. Where Indian troops are engaged, there is a unique opportunity for greater refinement of personnel classification based on the dietary habits of different ethnic groups or cults more or less segregated in different regiments.

TABLE 101

Relative Distribution by Command of Total Strengths of Each Category of Personnel

	British U.K.	Dominion	Indian	British African
Egypt, Cyrenaica, Tripolitania	74·72	93·81	57·21	77·10
Palestine	10·82	4·30	10·63	11·46
Ninth Army—Syria	8·41	1·58	16·43	9·73
Ninth Army—Cyprus	1·02	—	10·57	0·06
Sudan and Eritrea	0·95	—	1·45	—
Malta	3·93	—	—	1·61
Aden	0·15	0·31	3·71	0·04
	100·00	100·00	100·00	100·00

TABLE 102

Relative Hospitalization Rates by Command ; U.K. Troops

	Egypt, Cyrenaica, Tripolitania	Palestine	Ninth Army		Sudan and Eritrea	Malta	Aden	Total
			Syria	Cyprus				
Malaria	7·2	7·3	15·7	4·5	55·4	2·1	7·8	100·0
Dysentery	15·9	13·8	10·5	8·6	12·7	14·9	23·7	100·0
Sandfly Fever	4·0	9·5	17·1	61·2	0·6	7·6	—	100·0
Infective Hepatitis	16·5	9·7	19·1	18·3	7·5	15·4	13·5	100·0
V.D.	3·8	5·2	10·7	18·1	20·6	3·9	37·8	100·0
All Diseases	10·7	10·5	12·0	20·6	17·1	9·1	20·1	100·0
Injuries, non E.A.	9·1	10·6	11·2	20·8	10·0	12·0	26·3	100·0
Injuries, E.A.	74·5	8·6	1·8	11·7	2·2	1·2	—	100·0
Total Admissions	11·2	10·5	11·8	20·5	16·2	9·3	20·5	100·0

TABLE 103

Distribution of Hospital Cases and Strength Among Principal Categories of Personnel

Category of Personnel	Percentage of	
	Admissions	Strength
British (U.K.)	51·75	52·78
Dominion	9·64	10·25
Indian	11·14	12·18
British African	8·07	7·99
Others	19·40	16·80
Total M.E.F.	100·00	100·00

TABLE 104

Relative Morbidity Rates ; Hospital Admissions

	U.K. troops	Dominion			Indian			British African		
		Crude	Standard		Crude	Standard		Crude	Standard	
			A	B		A	B		A	B
Dysentery	7·1	6·5	6·0	6·2	3·2	3·8	3·8	22·4	22·1	22·1
P.U.O.	6·6	4·2	3·9	4·0	0·4	0·5	0·4	2·6	2·5	2·5
Malaria	5·6	3·4	3·7	3·9	10·7	10·9	9·5	1·5	1·5	1·5
Sandfly Fever	4·4	3·6	5·1	4·9	1·3	0·8	0·9	2·8	3·0	2·8
Infective Hepatitis	4·3	2·0	1·9	2·0	1·4	1·6	1·6	0·8	0·8	0·8
Venereal Diseases	3·7	6·6	7·7	7·2	5·3	3·6	4·3	8·1	8·4	8·3
Bronchitis	2·3	3·1	3·1	3·1	4·4	4·5	4·6	4·5	4·5	4·5
Scabies	1·5	0·9	0·9	0·9	2·5	2·3	2·2	1·7	1·8	1·7
Diphtheria	1·1	0·2	0·2	0·2	0·0	0·0	0·0	0·3	0·3	0·3
Pneumonia	0·6	1·5	1·5	1·3	0·5	0·5	0·6	4·5	4·4	4·4
Tuberculosis	0·2	0·4	0·4	0·4	0·7	0·7	0·7	0·8	0·8	0·8
Enteric Fever	0·2	0·5	0·5	0·4	0·0	0·0	0·0	0·1	0·1	0·1
Heat Effects	0·2	0·1	0·1	0·1	0·0	0·0	0·0	0·0	0·0	0·0
Typhus	0·1	0·0	0·0	0·0	0·1	0·1	0·1	0·0	0·0	0·0
Smallpox	0·0	0·1	0·1	0·1	0·0	0·0	0·0	0·0	0·0	0·0
Schistosomiasis	0·0	0·1	0·1	0·1	0·1	0·1	0·1	0·7	0·8	0·7
Relapsing Fever	0·0	0·1	0·1	0·1	0·1	0·1	0·0	0·0	0·0	0·0
All Other Diseases	62·1	66·7	64·7	65·1	69·3	70·5	71·2	49·2	49·0	49·5
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 105

Relative Casualty Rates ; Hospital Admissions

	U.K. troops	Dominion			Indian			British African		
		Crude	Standard		Crude	Standard		Crude	Standard	
			A	B		A	B		A	B
Diseases of Skin	16·2	10·9	10·6	10·8	13·7	14·1	13·8	6·5	6·4	6·5
Diseases of E.N.T.	11·2	10·9	10·5	10·6	4·4	4·6	4·8	3·1	3·1	3·1
Mental and Nervous Disorders	4·3	4·8	4·4	4·4	2·2	2·7	2·6	2·0	2·0	2·0
Diseases of Eye	1·6	1·8	1·8	1·8	5·8	6·6	5·2	1·7	1·7	1·7
All Other Diseases	66·7	71·6	72·7	72·4	73·9	72·0	73·6	86·7	86·8	86·7
ALL DISEASES	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Diseases	85·2	82·4	82·9	83·1	83·6	81·9	83·0	91·5	91·6	91·5
Injuries non-E.A.	9·1	12·2	12·7	12·5	12·7	12·9	12·1	6·0	6·0	6·1
Injuries E.A.	5·7	5·4	4·4	4·4	3·7	5·2	4·9	2·5	2·4	2·4
ALL ADMISSIONS	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 106 **Comparative Morbidity Rates**

	U.K. troops	Dominion			Indian			British African		
		Crude	Standard		Crude	Standard		Crude	Standard	
			A	B		A	B		A	B
Dysentery	100·0	84·8	81·3	80·6	41·3	43·7	47·0	350·8	350·3	346·7
Malaria	100·0	55·9	62·1	64·3	174·7	157·6	146·4	28·7	29·4	29·1
Sandfly Fever	100·0	76·2	109·8	103·8	28·0	14·2	18·4	69·2	73·7	70·4
Infective Hepatitis	100·0	42·9	41·9	42·4	30·3	29·8	31·8	20·6	20·4	20·4
Venereal Diseases	100·0	164·6	197·5	181·3	130·9	79·1	101·3	241·1	253·3	246·9
Bronchitis	100·0	124·3	127·8	123·5	177·7	160·3	176·6	217·7	222·3	219·2
Diphtheria	100·0	19·5	17·7	17·8	1·7	1·9	2·0	34·0	33·5	33·5
Pneumonia	100·0	222·3	219·4	198·3	73·7	63·2	82·4	775·9	773·3	758·0
Tuberculosis	100·0	195·5	203·7	186·2	294·3	266·7	281·2	421·4	445·9	430·8
Enteric Fever	100·0	269·2	252·0	241·2	9·0	9·2	10·5	85·9	87·1	85·6
Typhus	100·0	48·4	41·7	41·1	70·9	84·3	83·2	64·5	62·6	62·8
Smallpox	100·0	147·0	124·8	129·1	41·1	50·4	48·6	147·0	141·7	143·1
Schistosomiasis	100·0	1,933·3	2,607·2	1,985·9	1,766·6	1,689·2	1,979·1	11,266·6	12,843·9	10,933·1
Relapsing Fever	100·0	227·3	240·2	254·0	372·7	273·4	174·3	36·4	37·4	40·3
Influenza	100·0	432·0	386·6	366·0	5·4	6·2	6·6	111·8	109·8	109·3
Tonsillitis	100·0	52·5	50·6	50·1	18·8	17·9	19·8	17·2	17·2	17·1
Mumps	100·0	355·8	426·1	313·9	1,016·3	308·2	736·0	1,746·5	2,285·3	1,799·1
Measles	100·0	448·0	495·0	407·3	34·8	15·7	28·7	260·8	292·3	263·5
Meningococcal Infection	100·0	107·7	98·7	91·2	61·5	56·3	72·8	1,207·7	1,253·0	1,190·7
Rheumatic Fever	100·0	30·0	30·1	30·8	30·0	33·7	35·6	77·1	80·2	80·8
Skin Diseases	100·0	62·6	62·1	62·1	77·3	70·2	74·4	44·3	44·5	44·5
Diseases of the Eye	100·0	100·7	99·8	100·9	326·0	324·9	280·5	114·8	113·5	114·2
Psychoneurosis	100·0	103·2	93·7	95·2	21·7	24·2	25·1	29·3	28·7	28·7
Accidental Injuries	100·0	129·1	135·5	131·6	130·7	119·5	120·7	68·1	69·3	69·0
Battle Casualties	100·0	90·6	73·4	73·1	60·9	76·9	78·2	44·6	43·3	43·3

TABLE 107 **Crude Relative Mortality Rates and Fatality Rates**

	RELATIVE MORTALITY				FATALITY (per 100 cases)			
	U.K. troops	Dominion	Indian	British African	U.K. troops	Dominion	Indian	British African
Accidental Injuries	32·13	28·03	34·55	11·21	1·39	0·88	1·13	1·45
Nervous Diseases	5·82	3·03	3·03	5·38	2·64	1·20	1·62	8·11
Enteric Fever	4·29	2·27	0·61	4·48	10·80	2·01	16·67	27·03
Typhus	3·88	2·27	0·61	2·69	24·35	27·27	5·26	54·55
Tuberculosis	2·63	9·09	26·06	20·18	5·83	9·68	19·63	21·63
Pneumonia	2·49	3·79	2·42	11·21	1·77	1·14	2·33	2·09
Smallpox	2·22	1·52	0·00	1·35	26·23	11·11	—	23·08
Malaria	1·25	0·00	0·61	0·90	0·10	—	0·03	0·52
Infective Hepatitis	1·11	0·76	1·21	0·90	0·12	0·18	0·42	0·94
Meningococcal Infection	0·83	0·00	0·61	4·04	12·24	—	14·29	10·34
Dysentery	0·83	0·76	0·00	0·90	0·05	0·05	—	0·03
Others	42·52	48·48	30·29	36·76				
TOTAL	100·00	100·00	100·00	100·00				

TABLE 108 **Crude Comparative Mortality and Comparative Fatality Rates**

	RELATIVE MORTALITY				FATALITY			
	U.K. troops	Dominion	Indian	British African	U.K. troops	Dominion	Indian	British African
Accidental Injuries	100	87	107	35	100	63	81	104
Nervous Diseases	100	52	52	92	100	45	61	307
Enteric Fever	100	53	14	104	100	18	154	250
Typhus	100	58	16	69	100	112	21(1)	224(2)
Tuberculosis	100	346	991	767	100	166	337	374
Pneumonia	100	152	97	450	100	64	132	118
Smallpox	100	68	—	61	100	42	—	88(3)
Malaria	100	—	49	72	100	—	30	520
Infective Hepatitis	100	68	109	81	100	150	350(4)	783(4)
Meningococcal Infection....	100	—	73	487	100	—	117	84
Dysentery	100	92	—	108	100	100	—	60

(1) One death only. (2) 6 deaths. (3) 3 deaths. (4) 2 deaths.

§4 MEDICAL ETHNOGRAPHY OF THE MIDDLE EAST, 1944 (*See Chart* 19)

THE source of data in this section is the 1944 Annual Hygiene Report prepared by the Central Statistical Section G.H.Q., M.E.F. Because of different geographical distribution of troops (Table 109) and of the differential incidence of hospitalization between commands (Table 110), all morbidity figures have been standardized with respect to locality in accordance with the procedure outlined in the previous section. For this purpose, United Kingdom troops have been the standard. Table 111 shows the standardizing factors thus calculated. They represent the amount by which crude rates should be adjusted to allow for geographical variation w.r.t. risk of contracting diseases specified. For example, the standardizing factor for Indians with respect to Sandfly Fever is 0·57. From Table 110 we see that by far the highest incidence of Sandfly Fever occurs in Syria and Cyprus. Since over 35% of Indian troops are stationed in these areas we would expect them to have a much higher *total* incidence than United Kingdom troops, of whom only 10% are in Syria and Cyprus. The application of the standardizing factor 0·57 therefore means that we have to reduce the crude Indian rate by almost one half to make it comparable with that of United Kingdom troops.

In agreement with data for 1943 (§3) Tables 112-114 point to the following conclusions:—

(*a*) as compared with troops both of European and of Asiatic stock, Africans were especially prone to DYSENTERY and PNEUMONIA, being less prone to MALARIA;

(*b*) troops of United Kingdom domicile were much less prone to TUBERCULOSIS, SCHISTOSOMIASIS and MUMPS, and much more prone to INFECTIVE HEPATITIS and DIPHTHERIA than were troops of Asiatic or African origin;

(*c*) United Kingdom and Indian troops were much less prone to V.D. than were troops of African domicile;

(*d*) Indian troops were much less prone to SANDFLY FEVER than either Africans or United Kingdom troops.

In contradistinction to data for 1943, the same tables also show:

(*a*) Indian troops had a lower hospitalized incidence of MALARIA than had troops of United Kingdom domicile, although twice as high as that of the U.D.F. and about six times as high as that of British Africans;

(*b*) British Africans had conspicuously few cases of MEASLES.

The source of crude figures for 1943 did not separately list P.U.O., which appears in Table 113. The exceptionally low rate for P.U.O. among troops of Asiatic stock as compared with Africans and United Kingdom troops tallies closely with that of Sandfly Fever.

On the basis of features common to the statistics of two consecutive years, the following call for comment:—

(*a*) while troops of Asiatic and African origin are not conspicuously more liable to MEASLES, they are particularly liable to MUMPS;

(*b*) the relative immunity to DIPHTHERIA of African and Asiatic troops is suggestive *vis-a-vis* the widespread occurrence of Diphtheritic sores in tropical countries, and the comparative rarity of Cutaneous Diphtheria in United Kingdom;

(*c*) the relative susceptibility of Africans to PNEUMONIA tallies with experience of troops in West Africa, 1944 (§1), but the high Tuberculosis rate among Africans in M.E.F. does not;

(*d*) the higher incidence of INFECTIVE HEPATITIS among United Kingdom troops as compared with troops of non-European origin tallies with data both from C.M.F. and from West Africa.

It is worthy of note that the Malaria rate for Indian troops is much lower by comparison with United Kingdom troops in 1944 than in the previous year. The difference is associated with a striking increase of malaria among United Kingdom troops. Its incidence among Indians remained fairly constant. The Malaria rate for Africans is consistently low by comparison either with United Kingdom or with Indian troops.

With regard to *mortality* and *fatality* (as respectively defined in §3 above), the main features which emerge from Tables 115 and 116 are:

(*a*) the important cause of death common to all troops is INJURIES;

(*b*) among British Africans and troops of Asiatic origin the most important cause of death (over 30%) is TUBERCULOSIS;

(*c*) PNEUMONIA makes a substantial (5%) contribution to deaths among Africans but this is *not* because it is more fatal;

(*d*) C.S.F. has a Fatality Rate of about 20% among all troops, being somewhat less fatal among African than among United Kingdom troops.

Since the numbers involved are very low, mortality and fatality differentials with respect to Malaria and Dysentery are of doubtful significance.

In view of the agreement between 1943 and 1944 M.E.F. Statistics disclosed in this section, it is appropriate to end Part IV. by summarizing conclusions derived from experience of the M.E.F. and of the C.M.F. (§2):—

(*a*) In both theatres Indian and African troops consistently had an exceptionally low incidence of DIPHTHERIA and an exceptionally high incidence of TUBERCULOSIS, as compared with United Kingdom troops.

(*b*) Indian troops in both theatres had a low incidence of SANDFLY FEVER and GONORRHOEA.

(*c*) In M.E.F. Indian and African personnel had a very high incidence of MUMPS as compared with United Kingdom troops and a low incidence of INFECTIVE HEPATITIS both in 1943 and 1944.

(*d*) Among Indian and African personnel in M.E.F., TUBERCULOSIS is the predominant fatal disease, being more fatal as well as more frequent than among United Kingdom troops.

(*e*) African personnel are more prone to PNEUMONIA than either Indian or United Kingdom, both in C.M.F. and M.E.F.; but it is not more fatal to them.

TABLE 109 **Relative Strengths by Commands**

	U.K. Troops	U.D.F.	Indians	British Africans
Egypt	60·9	80·1	40·6	59·8
Cyrenaica	3·7	11·2	3·2	11·5
Tripolitania	2·2	2·4	0·9	4·8
Palestine	20·3	4·2	15·6	15·9
Syria	9·9	1·9	28·5	7·8
Cyprus	1·3	0·1	6·6	0·2
Sudan and Eritrea	1·4	—	—	—
Aden	0·3	—	4·5	—
All M.E.F.	100·0	100·0	100·0	100·0

TABLE 110 **Relative Incidence of Disease by Commands (U.K. Troops)**

	Egypt	Cyrenaica	Tripolitania	Palestine	Syria	Cyprus	Sudan and Eritrea	Aden	Total	Sample Size
Malaria	13·7	3·3	2·7	16·1	14·0	2·4	35·4	12·4	100·0	8344
P.U.O.	14·3	4·8	10·9	25·3	11·5	9·4	17·0	6·8	100·0	5865
Dysentery	17·0	11·8	5·9	12·0	13·7	7·4	12·1	20·3	100·0	5577
All V.D.	5·3	1·8	3·9	5·0	9·1	12·9	17·3	44·8	100·0	3161
Syphilis	*8·1*	*2·4*	*4·8*	*9·3*	*14·7*	*8·1*	*20·7*	*32·0*	*100·0*	*602*
Gonorrhoea	*4·7*	*3·1*	*9·6*	*5·0*	*7·7*	*13·6*	*24·3*	*32·0*	*100·0*	*872*
Other V.D.	*5·0*	*1·0*	*1·0*	*4·0*	*8·5*	*13·6*	*13·1*	*53·8*	*100·0*	*1687*
Infective Hepatitis	10·6	9·1	4·2	16·9	26·6	15·7	9·3	7·5	100·0	2525
Mental Diseases	15·6	11·3	9·1	14·9	14·0	2·8	16·6	15·7	100·0	2030
Sandfly Fever	4·0	0·2	2·4	11·0	22·6	58·3	1·5	—	100·0	1914
Pneumonia	15·1	13·2	10·5	12·1	13·2	10·5	11·3	14·0	100·0	725
Scabies	13·4	13·8	3·5	4·7	15·7	31·5	10·2	7·1	100·0	599
Diphtheria	30·1	7·5	2·2	20·4	19·4	16·1	4·3	—	100·0	472
Influenza	17·3	48·9	—	3·3	18·5	12·0	—	—	100·0	281
Tuberculosis	17·3	8·5	4·6	16·3	14·6	15·8	22·9	—	100·0	156
Enteric Fever	8·7	6·2	3·3	6·3	10·5	—	11·0	54·1	100·0	110
Smallpox	60·7	24·1	—	10·7	4·5	—	—	—	100·0	91
Rheumatic Fever	13·4	17·7	19·0	7·4	26·0	16·5	—	—	100·0	63
Measles	19·8	—	—	40·5	39·7	—	—	—	100·0	62
Mumps	16·7	—	15·3	17·4	—	—	50·7	—	100·0	42
C.S.F.	16·4	20·9	—	10·4	52·2	—	—	—	100·0	25
Relapsing Fever	1·4	20·0	—	10·0	14·3	54·3	—	—	100·0	8
Typhus	28·6	—	—	71·4	—	—	—	—	100·0	9
Schistosomiasis	5·9	82·4	—	11·8	—	—	—	—	100·0	3
All Diseases	11·3	7·5	7·8	12·2	12·5	11·4	15·3	21·9	100·0	79474
All Injuries	8·5	9·5	13·8	11·8	13·1	9·9	9·1	24·3	100·0	7683
All Admissions	11·0	7·7	8·4	12·2	12·5	11·3	14·7	22·2	100·0	87157

TABLE 111

Locality Standardizing Factors (based on United Kingdom standard)

	U.D.F.	Indians	British Africans
Malaria	1·11	1·06	1·11
P.U.O.	1·17	1·11	1·09
Dysentery	0·95	1·04	1·02
All V.D.	1·17	0·69	1·14
Syphilis	*1·20*	*0·81*	*1·11*
Gonorrhoea	*1·16*	*0·74*	*1·08*
Other V.D.	*1·17*	*0·62*	*1·17*
Infective Hepatitis	1·24	0·82	1·08
Mental Diseases	1·00	1·06	1·02
Sandfly Fever	1·83	0·57	1·25
Pneumonia	0·95	1·03	1·00
Scabies	0·91	0·88	1·00
Diphtheria	0·96	1·10	1·05
Influenza	0·78	1·00	0·82
Tuberculosis	1·03	1·08	1·05
Enteric Fever	1·00	0·75	1·04
Smallpox	0·78	1·41	0·98
Rheumatic Fever	0·97	0·84	0·94
Measles	1·35	0·94	0·85
Mumps	1·00	1·50	1·50
C.S.F.	1·09	0·75	1·00
Relapsing Fever	1·33	0·57	1·00
Typhus	1·11	1·25	1·00
Schistosomiasis	0·40	1·00	0·40
All other diseases	1·03	0·95	1·03
All Diseases	1·06	0·95	1·05
All Injuries	1·10	0·88	1·01
Total Admissions	1·06	0·94	1·05

TABLE 112

Relative Morbidity Rates

	Crude				Standardized			
	U.K. troops	U.D.F.	Indians	British Africans	U.K. troops	U.D.F.	Indians	British Africans
Malaria	10·50	3·28	7·13	1·00	10·50	3·46	7·95	1·07
P.U.O.	7·38	4·78	1·18	4·70	7·38	5·32	1·37	4·92
Dysentery	7·02	5·03	3·39	23·57	7·02	4·54	3·71	23·06
All V.D.	3·98	11·55	6·29	12·75	3·98	12·93	4·55	13·96
Syphilis	*0·76*	*3·02*	*1·58*	*2·97*	*0·76*	*3·45*	*1·34*	*3·16*
Gonorrhoea	*1·10*	*1·79*	*1·04*	*2·14*	*1·10*	*1·97*	*0·81*	*2·22*
Other V.D.	*2·12*	*6·75*	*3·68*	*7·64*	*2·12*	*7·50*	*2·40*	*8·58*
Infective Hepatitis	3·18	0·98	2·31	0·61	3·18	1·16	1·99	0·63
Mental Diseases	2·55	4·25	1·45	1·38	2·55	4·04	1·62	1·35
Sandfly Fever	2·41	0·97	0·77	1·26	2·41	1·69	0·46	1·52
Pneumonia	0·91	0·94	0·76	4·40	0·91	0·84	0·83	4·22
Scabies	0·75	1·42	2·46	0·79	0·75	1·22	2·28	0·75
Diphtheria	0·59	0·21	0·01	0·01	0·59	0·19	0·01	0·01
Influenza	0·35	1·46	0·19	0·27	0·35	1·08	0·20	0·21
Tuberculosis	0·20	0·71	0·66	1·26	0·20	0·69	0·87	1·27
Enteric Fever	0·14	0·09	0·02	0·07	0·14	0·09	0·01	0·06
Smallpox	0·11	0·10	0·12	0·10	0·11	0·08	0·18	0·10
Rheumatic Fever	0·08	0·06	0·07	0·06	0·08	0·05	0·06	0·05
Measles	0·08	0·04	0·07	0·01	0·08	0·06	0·07	0·01
Mumps	0·05	0·13	1·37	0·89	0·05	0·12	2·16	0·90
C.S.F.	0·03	0·09	0·03	0·16	0·03	0·09	0·02	0·15
Relapsing Fever	0·01	—	0·04	—	0·01	—	0·03	—
Typhus	0·01	0·03	—	0·01	0·01	0·03	—	0·01
Schistosomiasis	0·003	0·21	0·07	0·70	0·003	0·08	0·07	0·26
All Other Diseases	59·66	63·67	71·60	46·02	59·66	62·25	71·55	45·49
All Diseases	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
All Diseases	91·18	84·23	86·00	94·53	91·18	83·63	86·90	94·69
All Injuries	8·81	15·77	14·00	5·47	8·81	16·37	13·10	5·31
All Admissions	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00

TABLE 113 **Comparative Morbidity Rates**

	Crude				Standardized			
	U.K. troops	U.D.F.	Indians	British Africans	U.K. troops	U.D.F.	Indians	British Africans
Malaria	100·0	35·1	72·9	11·9	100·0	39·0	77·3	13·3
P.U.O.	100·0	72·9	17·1	80·1	100·0	85·2	19·0	87·3
Dysentery	100·0	80·5	51·9	422·1	100·0	76·5	54·0	430·6
All V.D.	100·0	326·6	169·9	402·9	100·0	384·2	116·8	459·6
Syphilis	*100·0*	*447·7*	*223·0*	*491·3*	*100·0*	*537·3*	*180·7*	*545·3*
Gonorrhoea	*100·0*	*183·2*	*101·4*	*245·4*	*100·0*	*212·4*	*75·1*	*265·0*
Other V.D.	*100·0*	*357·6*	*186·4*	*452·7*	*100·0*	*418·4*	*115·6*	*529·7*
Infective Hepatitis	100·0	34·7	78·1	24·0	100·0	43·1	64·0	26·0
Mental Diseases	100·0	187·3	61·1	67·7	100·0	187·3	64·8	69·1
Sandfly Fever	100·0	45·4	34·2	66·0	100·0	83·1	19·5	82·5
Pneumonia	100·0	115·2	89·8	605·5	100·0	109·4	92·5	605·5
Scabies	100·0	211·4	350·7	131·2	100·0	192·3	308·7	131·2
Diphtheria	100·0	39·1	2·1(2)	3·0(4)	100·0	37·4	2·6	3·0
Influenza....	100·0	464·3	56·4	94·3	100·0	362·1	56·4	77·1
Tuberculosis	100·0	402·6	360·3	801·3	100·0	414·1	450·0	841·0
Enteric Fever	100·0	72·7	12·7(3)	61·8	100·0	72·7	90·9	63·6
Smallpox....	100·0	102·2	115·6	113·3	100·0	80·0	162·2	111·1
Rheumatic Fever	100·0	83·9(8)	100·0	93·5	100·0	80·6	83·9	87·1
Measles	100·0	64·5(6)	100·0	19·0(2)	100·0	87·1	93·5	9·7
Mumps	100·0	266·7	2,766·7	2,114·3	100·0	266·7	4,152·4	2,219·0
C.S.F.	100·0	333·3	100·0(5)	650·0	100·0	366·7	75·0	650·0
Relapsing Fever	100·0(8)	—	475·0(8)	—	100·0	—	275·0	—
Typhus	100·0(9)	325·0(4)	—	125·0(3)	100·0	350·0	—	125·0
Schistosomiasis	100·0(3)	9,200·0	2,900·0	34,800·0	100·0	3,680·0	2,900·0	13,900·0
All Diseases	100·0	112·4	107·4	125·7	100·0	118·3	102·1	131·0
All Injuries	100·0	217·7	180·9	75·2	100·0	239·5	159·2	76·0
All Admissions	100·0	121·7	113·9	121·2	100·0	129·0	107·1	126·1

Figures in brackets are actual numbers of admissions.

TABLE 114

Comparative Standardized Morbidity Rates

	U.K. TROOPS	INDIANS		BRITISH AFRICANS	
		1943	1944	1943	1944
Malaria	100·0	157·6	77·3	29·4	13·3
Dysentery	100·0	43·7	54·0	350·3	430·6
Infective Hepatitis	100·0	29·8	64·0	20·4	26·0
Sandfly Fever	100·0	14·2	19·5	73·7	82·5
Pneumonia	100·0	63·2	92·5	773·3	605·5
Diphtheria	100·0	1·9	2·6	33·5	3·0
Tuberculosis	100·0	266·7	450·0	445·9	841·0
Measles	100·0	15·7	93·5	292·3	9·7
Mumps	100·0	308·2	4,152·4	2,285·3	2,219·0
Schistosomiasis	100·0	1,689·2	2,900·0	12,843·9	13,900·0

TABLE 115

Relative Mortality Rates and Fatality Rates

	Relative Mortality				Fatality (per 100 cases)			
	U.K. troops	U.D.F.	Indians	British Africans	U.K. troops	U.D.F.	Indians	British Africans
All Injuries	40·95	28·79	30·47	11·76	1·47	0·75	1·34	1·89
Pneumonia	4·35	3·03	1·56	5·10	1·66	1·59	1·47	1·08
Enteric Fever	3·62	—	—	1·57	9·09	—	—	21·05
Tuberculosis	3·26	12·12	37·50	30·59	5·77	8·42	40·68	22·61
Infective Hepatitis	3·26	—	2·34	0·78	0·36	—	0·73	1·20
C.S.F.	2·17	3·03	0·78	2·75	24·00	16·67	20·00	16·28
Smallpox	1·81	1·52	—	2·75	5·49	7·14	—	25·00
Malaria	1·09	6·06	1·56	0·39	0·04	0·90	0·16	0·36
Dysentery	0·36	1·52	—	1·57	0·02	0·15	—	0·06
Other Diseases	39·13	43·93	25·79	42·74	....	....	....	....
All Causes	100·00(276)	100·00(66)	100·00(128)	100·00(255)	0·32	0·41	0·62	0·88

TABLE 116

Comparative Mortality and Fatality Rates

	Absolute Mortality				Fatality			
	U.K. troops	U.D.F.	Indians	British Africans	U.K. troops	U.D.F.	Indians	British Africans
Injuries	100·0	111·5	165·1	96·6	100·0	51·0	91·2	128·6
Pneumonia	100·0	110·6	79·7	394·3	100·0	95·8	88·6	65·1
Enteric Fever	100·0	—	—	145·4	100·0	—	—	231·6
Tuberculosis	100·0	589·5	2,550·9	3,153·1	100·0	145·9	705·0	391·9
Infective Hepatitis	100·0	—	159·4	80·8	100·0	—	202·8	333·3
C.S.F.	100·0	220·7	79·6	424·1	100·0	69·5	83·3	67·8
Smallpox	100·0	132·5	—	509·2	100·0	130·1	—	455·4
Malaria	100·0(3)	885·9(4)	319·5(2)	121·5(1)	100·0(3)	2,250·0(4)	400·0(2)	900·0(1)
Dysentery	100·0(1)	660·0(1)	—	1,448·0(4)	100·0(1)	750·0(1)	—	300·0(4)
All Diseases	100·0	158·6	221·9	336·3	100·0	128·1	193·8	275·0

Figures in brackets are actual numbers of deaths.

Part V. MEDICAL RECATEGORIZATION AND PHYSIQUE

§1 MEDICAL EXAMINATION AND RECATEGORIZATION IN THE U.K. 1943 AND 1944

DATA for this section came from the Unit Weekly Medical Return (A.F. W3181) consolidated at District/Command Level in A.F. W3180. The latter, formerly in force in the United Kingdom (and some small stations elsewhere), has now been superseded by A.Fs. W3166 and 3167. Successive audits of these United Kingdom returns disclosed disturbing inaccuracies w.r.t. figures cited in them. Thus *total* numbers examined and *net numerical* increases or decreases recorded for each medical category are certainly *deficient*. On the other hand, we are fully entitled to regard any such figure as a *lower* limit of the true one, because cases included may be reasonably considered as items of a *representative* sample. *Percentages* of cases upgraded and downgraded from any given category may therefore be taken as reliable.

" X " categories for men over 41 are included in Military Other Ranks Tables. A.1 cases are not shown in 1943 (except for net numerical changes) since the necessary information was not recorded in that year. Category C was not divided into C.1 and C.2 until the end of 1943. With regard to A.T.S., A.W.5 and B.W.5 were not introduced until 1944. V.A.Ds. are included from February, 1944, onwards. Throughout, Category E cases refer only to discharges from the Army carried out directly from units in contradistinction to total discharges, many of which take place in hospitals.

To bring into relief changes with respect to relative frequencies of upgradings or downgradings from a given medical category, it is helpful to have an index so defined that its value is: (*a*) *zero* when upgradings and downgradings balance; (*b*) *positive* when upgradings exceed downgradings, reaching a maximum of + 100 when all regradings are upgradings; (*c*) *negative* when downgradings exceed upgradings, reaching a maximum of — 100 when all regradings are downgradings. If u_c is the percentage of upgradings from the medical category *c*, d_c is the percentage downgradings ditto, and $r_c = (u_c + d_c)$ the percentage regradings, being the total of downgradings and upgradings, the *Regrading Displacement Index* (D_c) with the properties defined above is:

$$D_c = 100\,(u_c - d_c) \div r_c$$

Tables 119 (males) and 122 (females) exhibit the value of this index for the four quarters of 1943 and 1944 and for each year as a whole.

The general impression which Tables 117-120 convey is one of all-round deterioration, *i.e.*:

(*a*) to an excess of the percentage upgradings over the percentage downgradings in 1943, there corresponds a smaller excess or even a deficiency in 1944;

(*b*) to an excess of downgradings in 1943 there corresponds a greater excess of downgradings in 1944.

Among circumstances contributing to this deterioration are the following:

(*a*) During the greater part of 1944 there were frequent complaints by the Training Authorities that recruits entering the Army were generally of poorer physique than were those of 1943.

(*b*) During 1944 there was a large increase of units receiving mobilization orders. In these circumstances all military personnel are examined with respect to medical categories, and there may well be a tendency to set a higher standard for overseas service.

(*c*) M.Os. with overseas experience may have more exacting views about suitability for overseas service.

(*d*) There were increasing numbers of sick and wounded transferred from Overseas Theatres and of repatriated Ps.O.W.

(*e*) Of Army Selection Centres set up in 1943, four were functioning during the second half. At the outset they dealt chiefly with Category C personnel, and large numbers were invalided out of the Army. These Centres (later included in 45 Division) were working throughout 1944, and dealt more and more with Army " misfits " of any medical category. They also reviewed categories from A.1-B.7. The result was an increased amount of downgrading.

With reference to changes in 1944:

(*a*) Much of the movement may be the result of difference of medical opinion with reference to the demarcation of A from B or with respect to B.2 and B.7 in the locomotion categories.

(*b*) Variation with respect to visual assessment seems to be responsible for the regrading of a considerable proportion of men formerly placed in categories defined by defects of vision.

(*c*) During the last quarter of 1944 the type of Army recruit improved greatly, consequent upon the volunteers for the Royal Navy and R.A.F. having been made available for the Army.

Table 120 shows net numerical changes among military personnel with respect to each category during the two years. It has already been emphazised that such figures can give us only a lower limit below which the true figure cannot lie. The striking fact in this table is a net numerical decrease of over 90,000 cases of A.1. Broadly speaking, there was a net decrease with respect to all A categories (mainly A.1), a slight increase of middle B categories (mainly B.2) and a heavy increase of B.7 and C categories. (There was an increase of E too, but discharges from the Army are dealt with elsewhere.) As a result of recategorization in the United Kingdom there was thus a large net transfer during 1943 and 1944 from highest to lowest categories, involving considerable *internal* wastage.

Tables 121-123 show that downgradings from A.W.1 in the *Women's Service* numerically exceeded the total of upgradings from **all** other categories.

Summary

The outstanding features of medical recategorization in the United Kingdom in 1943 and 1944 have thus been as follows:

(*a*) Steady deterioration among military personnel throughout the period with respect to the ratio of upgradings to downgradings, resulting in a substantial excess of downgradings over upgradings for every major category at the end of 1944.

(*b*) Consistent (though decreasing) excess of upgradings over downgradings with respect to A.T.S. other ranks in categories *other* than A.W.1, but a numerical excess of downgradings from A.W.1 over the total of upgradings from all other categories.

(*c*) Considerable internal wastage caused by large scale net transfer of military O.Rs. from highest to lowest categories.

TABLE 117

General Recategorization Table ; Military Other Ranks, 1943

Initial Category	Numbers Examined	FINAL CATEGORY (as percentage of numbers examined in each category)													
		A.1	A.2	A.3	A.4	A.5	B.1	B.2	B.2a	B.5	B.6	B.7	C.1	C.2	E.
A.1															
A.2	87,604	6·9	**84·2**	0·2	0·1	0·1	0·7	2·4	0·1	0·0	0·1	3·1	0·1	1·5	0·5
A.3	24,926	5·8	0·7	**87·5**	1·8	0·1	0·3	0·4	0·6	0·3	0·1	0·5	0·1	1·3	0·5
A.4	58,950	2·8	0·4	1·1	**90·7**	0·3	0·3	0·2	0·1	1·1	0·1	0·3	0·1	1·9	0·7
A.5	5,821	1·9	2·4	1·1	2·7	**82·8**	0·6	0·8	0·1	1·4	0·3	1·9	0·2	3·0	0·9
B.1	158,887	6·4	1·6	0·2	0·2	0·0	**85·6**	0·7	0·1	0·1	0·2	0·8	0·2	3·0	0·9
B.2	59,986	1·8	3·2	0·2	0·3	0·1	1·9	**85·8**	0·1	0·1	0·1	2·8	0·1	2·7	0·8
B.2a	4,202	2·1	1·1	2·8	3·8	0·5	3·8	2·0	**77·2**	1·8	0·1	0·7	0·2	2·8	1·1
B.5	9,364	0·9	0·5	0·4	2·7	0·8	3·4	2·5	0·8	**82·4**	0·2	0·5	0·2	3·4	1·4
B.6	11,084	1·1	0·1	0·0	0·2	0·1	1·5	0·4	0·0	0·0	**90·9**	0·3	0·2	3·6	1·6
B.7	48,853	0·4	0·9	0·0	0·1	0·1	0·7	2·5	0·1	0·1	0·0	**91·8**	0·2	2·2	0·8
C.1	4,985	0·6	0·1	0·0	0·1	0·0	1·5	0·4	0·1	0·1	0·2	0·8	**68·9**	22·0	5·0
C.2	89,088	0·8	0·2	0·0	0·1	0·0	2·0	0·7	0·1	0·1	0·2	1·2	3·5	**86·8**	4·2

TABLE 118

General Recategorization Table; Military Other Ranks, 1944

Initial Category	Numbers Examined	FINAL CATEGORY (as percentage of numbers examined in each category)													
		A.1	A.2	A.3	A.4	A.5	B.1	B.2	B.2a	B.5	B.6	B.7	C.1	C.2	E.
A.1	547,460	**87·7**	1·3	0·3	0·2	0·0	2·9	1·4	0·0	0·0	0·2	1·3	0·8	2·8	1·1
A.2	64,915	3·8	**84·3**	0·2	0·1	0·1	0·7	3·6	0·1	0·0	0·1	4·1	0·5	1·8	0·6
A.3	20,468	5·6	0·5	**87·0**	1·7	0·1	0·4	0·3	1·1	0·3	0·0	0·4	0·4	1·5	0·6
A.4	45,695	1·9	0·2	1·1	**90·9**	0·4	0·2	0·1	0·1	1·4	0·1	0·3	0·6	1·9	0·9
A.5	3,518	1·0	1·8	1·0	2·5	**83·4**	0·4	0·7	0·0	2·3	0·2	1·2	1·8	2·5	1·1
B.1	139,590	3·6	0·7	0·0	0·1	0·0	**87·5**	0·8	0·1	0·1	0·2	0·9	0·9	3·7	1·4
B.2	56,097	0·9	1·6	0·1	0·1	0·0	1·1	**87·9**	0·1	0·1	0·1	3·5	0·9	2·6	1·0
B.2a	3,384	0·9	0·6	1·7	1·3	0·1	4·2	1·8	**80·9**	1·8	0·0	0·8	1·3	3·0	1·4
B.5	8,543	0·5	0·1	0·2	1·7	0·5	2·5	1·2	0·8	**84·7**	0·2	0·6	1·5	3·8	1·8
B.6	11,309	0·6	0·0	0·0	0·0	0·0	1·1	0·3	0·0	0·2	**88·8**	0·3	0·7	5·1	2·7
B.7	59,699	0·3	0·6	0·0	0·0	0·0	0·4	1·5	0·0	0·0	0·1	**92·5**	1·0	2·3	1·1
C.1	33,192	0·6	0·1	0·0	0·1	0·1	2·1	0·6	0·0	0·1	0·2	1·3	**80·8**	10·7	3·3
C.2	109,700	0·5	0·1	0·0	0·1	0·0	1·5	0·4	0·0	0·1	0·1	0·7	8·0	**83·2**	5·3

TABLE 119

Regrading Displacement Index; Military Other Ranks, 1943 and 1944

	1943				1944				TOTALS	
	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	1943	1944
A.1	—100·0	—100·0	—100·0	—100·0	—100·0	—100·0	—100·0	—100·0	—100·0	—100·0
A.2	— 4·5	— 3·8	— 20·3	— 26·7	— 37·3	— 52·0	— 61·7	— 59·5	— 12·1	— 51·6
A.3	+ 11·3	+ 14·7	— 5·0	— 12·5	— 6·7	— 6·5	— 1·9	— 15·4	+ 4·0	— 7·0
A.4	+ 3·7	— 1·1	— 19·2	— 23·3	— 21·5	— 28·0	— 29·1	— 45·7	— 7·5	— 29·7
A.5	+ 14·3	+ 4·4	— 27·7	— 28·7	— 17·1	— 25·6	— 17·5	— 39·2	— 5·8	— 24·1
B.1	+ 29·7	+ 26·3	+ 5·9	— 4·3	— 14·8	— 31·0	— 41·8	— 38·5	+ 16·7	— 29·6
B.2	+ 20·5	+ 10·8	— 2·9	— 18·6	— 19·3	— 39·4	— 50·0	— 47·7	+ 4·9	— 37·2
B.2a	+ 60·6	+ 36·6	+ 30·2	+ 29·6	+ 19·1	+ 17·8	+ 5·1	— 7·4	+ 41·5	+ 11·0
B.5	+ 51·0	+ 45·0	+ 19·5	+ 16·4	+ 9·9	+ 7·7	— 18·8	— 16·3	+ 36·0	— 2·0
B.6	— 8·9	— 18·1	— 42·9	— 34·8	— 38·5	— 58·0	— 63·2	— 75·0	— 25·3	— 57·1
B.7	+ 29·9	+ 27·8	+ 19·0	— 1·3	— 1·6	— 11·4	— 30·1	— 38·2	+ 19·5	— 20·0
C.1				— 73·7	— 61·0	— 40·2	— 30·3	— 37·7	— 73·7	— 45·8
C.2 (incl. C)	+ 22·6	+ 22·0	+ 6·7	+ 62·4	+ 68·1	+ 39·2	— 0·8	— 14·0	+ 36·4	+ 37·3

TABLE 120 **Net Numerical Increases (+) and Decreases (—) of Medical Categories; Military Other Ranks; 1943 and 1944**

	1943				1944				TOTALS	
	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	1943	1944
A.1	— 8,802	— 8,908	—10,082	— 9,369	—11,558	—15,334	—13,079	—16,297	—37,161	—56,268
A.2	— 113	+ 129	— 171	— 195	— 240	— 73	— 547	+ 98	— 350	— 762
A.3	+ 230	+ 113	— 16	— 22	— 27	— 197	— 67	— 60	+ 305	— 351
A.4	— 434	— 527	— 577	— 390	— 603	— 759	— 556	— 317	— 1,928	— 2,235
A.5	+ 24	— 28	— 35	— 81	— 25	+ 5	— 23	— 42	— 120	— 85
B.1	— 2,020	— 1,840	— 806	— 114	— 11	+ 176	+ 639	+ 1,892	— 4,780	+ 2,696
B.2	+ 987	+ 670	+ 910	+ 919	+ 1,175	+ 2,170	+ 1,506	+ 1,666	+ 3,486	+ 6,517
B.2a	— 63	+ 7	+ 9	— 11	+ 29	+ 46	+ 30	+ 30	— 58	+ 135
B.5	— 114	— 17	+ 27	— 5	+ 52	+ 33	+ 9	+ 45	— 109	+ 139
B.6	+ 369	+ 332	+ 293	+ 162	+ 148	+ 122	— 63	+ 82	+ 1,156	+ 289
B.7	+ 2,573	+ 2,469	+ 2,406	+ 1,829	+ 2,464	+ 2,883	+ 2,330	+ 2,497	+ 9,277	+ 10,174
C.1				+ 2,741	+ 5,111	+ 2,135	+ 1,210	+ 1,841	+ 2,741	+ 10,297
C.2 (incl. C)	+ 4,412	+ 4,665	+ 4,291	+ 786	— 864	+ 4,084	+ 4,323	+ 4,067	+ 14,154	+ 11,610
E.	+ 2,951	+ 2,935	+ 3,751	+ 3,750	+ 4,349	+ 4,709	+ 4,288	+ 4,498	+ 13,387	+ 17,844

TABLE 121 **General Recategorization Table ; A.T.S. Other Ranks, 1943 and 1944**

(*a*) A.T.S. Other Ranks, 1943

Initial Category	Numbers Examined	FINAL CATEGORY (as percentage of numbers examined in each category)								
		A.W.1	A.W.2	A.W.3	B.W.1	B.W.2	B.W.3	B.W.4	C.W.	E.
A.W.1										
A.W.2	2,594	17·8	**79·1**	1·1	0·3	0·3	0·1	—	0·8	0·4
A.W.3	1,797	5·3	1·7	**91·0**	0·2	—	0·3	0·1	0·6	0·8
B.W.1	10,984	14·5	0·6	0·3	**82·6**	0·2	0·1	0·0	0·6	1·0
B.W.2	596	6·5	4·2	1·8	6·5	**78·7**	0·2	—	1·2	0·8
B.W.3	345	6·7	0·6	7·8	2·9	0·6	**79·1**	0·3	0·6	1·4
B.W.4	98	5·1	—	2·0	3·1	1·0	1·0	**83·7**	3·1	1·0
C.W.	786	5·2	0·3	0·3	6·7	0·4	0·1	0·3	**80·3**	6·5

(*b*) A.T.S. Other Ranks and V.A.Ds., 1944

Initial Category	Numbers Examined	FINAL CATEGORY (as percentage of numbers examined in each category)										
		A.W.1	A.W.2	A.W.3	A.W.5	B.W.1	B.W.2	B.W.3	B.W.4	B.W.5	C.W.	E.
A.W.1	108,231	**97·7**	0·1	0·1	0·0	0·7	0·0	0·0	0·0	0·0	0·8	0·6
A.W.2	2,045	16·1	**78·7**	1·5	0·2	0·8	0·5	0·1	0·1	0·1	1·3	0·7
A.W.3	1,902	3·4	1·7	**92·3**	0·7	0·1	0·1	0·2	0·1	0·1	0·8	0·6
A.W.5	462	8·9	—	0·4	**88·5**	0·2	0·2	—	0·2	—	1·1	0·4
B.W.1	8,619	11·9	0·4	0·2	0·1	**84·4**	0·2	0·0	0·1	—	1·6	1·2
B.W.2	576	6·2	0·9	0·7	0·3	6·1	**81·8**	0·2	0·2	0·2	2·3	1·2
B.W.3	267	1·9	1·5	8·2	1·5	2·2	0·4	**80·5**	1·5	1·1	0·4	0·7
B.W.4	119	0·8	—	0·8	—	3·4	—	0·8	**89·9**	—	0·8	3·4
B.W.5	39	5·1	—	—	—	2·6	—	—	—	**84·6**	2·6	5·1
C.W.	1,580	4·7	**0·1**	**0·1**	**0·1**	**6·8**	**0·6**	**0·1**	**0·2**	**0·1**	**80·3**	**6·7**

TABLE 122

Regrading Displacement Index; A.T.S. Other Ranks, 1943 and 1944

	1943				1944				TOTALS	
	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	1943	1944
A.W.1	−100·0	−100·0	−100·0	−100·0	−100·0	−100·0	−100·0	−100·0	−100·0	−100·0
A.W.2	+ 77·1	+ 71·9	+ 65·6	+ 61·0	+ 62·7	+ 51·1	+ 38·0	+ 43·3	+ 71·2	+ 51·2
A.W.3	+ 47·7	+ 73·9	+ 60·9	+ 20·0	+ 27·1	+ 46·3	+ 26·3	+ 39·0	+ 55·6	+ 33·3
A.W.5					+ 76·0	+ 45·9	+ 39·3	+100·0		+ 61·7
B.W.1	+ 74·9	+ 86·4	+ 72·6	+ 69·5	+ 73·3	+ 64·0	+ 54·7	+ 45·8	+ 77·1	+ 61·5
B.W.2	+ 75·5	+ 88·0	+ 64·4	+ 86·9	+ 92·0	+ 38·0	+ 48·2	+ 47·9	+ 79·3	+ 56·0
B.W.3	+ 79·0	+ 54·2	+100·0	+100·0	+ 41·8	+ 84·5	+ 63·4	+100·0	+ 73·0	+ 61·9
B.W.4	+100·0	− 34·1	+ 49·8	+100·0	− 34·0	+ 50·3	+ 20·7	—	+ 50·0	+ 16·8
B.W.5					—	+ 33·3	+100·0	−100·0		0·0
C.W.	+ 59·6	+ 33·3	+ 19·4	+ 35·8	+ 43·4	+ 6·0	+ 38·5	+ 36·6	+ 34·0	+ 32·0

TABLE 123

Net Numerical Increases (+) and Decreases (—) of Medical Categories ; A.T.S. Other Ranks, 1943 and 1944

	1943				1944				TOTALS	
	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June	July-Sept.	Oct.-Dec.	1943	1944
A.W.1	+162	+239	— 80	—202	+ 6	—266	—285	—395	+ 119	—940
A.W.2	— 60	— 89	— 56	— 13	— 75	— 94	— 62	— 54	— 218	—285
A.W.3	+ 24	+ 53	+ 20	+ 9	— 8	— 2	— 2	0	+ 106	— 12
A.W.5					+ 5	— 1	+ 1	+ 11		+ 16
B.W.1	—438	—519	—269	—101	—223	—133	— 53	— 14	—1,327	—423
B.W.2	— 11	— 30	+ 15	+ 7	— 1	— 4	— 15	+ 1	— 19	— 19
B.W.3	— 10	— 9	— 5	— 1	— 13	— 7	— 10	— 3	— 25	— 33
B.W.4	+ 2	+ 5	— 1	+ 4	+ 11	+ 5	+ 3	+ 13	+ 10	+ 32
B.W.5					+ 7	0	+ 4	+ 2		+ 13
C.W.	+103	+160	+162	+110	+129	+250	+164	+208	+ 535	+751
E.	+228	+190	+214	+187	+162	+252	+255	+231	+ 819	+900

§2 MEDICAL RECATEGORIZATION IN PHYSICAL DEVELOPMENT CENTRES, JANUARY 1944–JUNE 1945

INFORMATION in this section comes from returns submitted directly to the War Office by Physical Development Centres. Figures refer to the three 6-monthly periods from January 1944-June 1945. Although all three P.D.C.s were already established in 1943 there was no uniform return for all Centres until the end of that year. Before then, each one submitted its own return, and no satisfactory consolidation was practicable. Tables shown include British Military Other Ranks only. In addition to cases completing courses they include casualties for which the Centres themselves have documentary responsibility, i.e. (*a*) cases rejected as unsuitable *after* the beginning of a course; (*b*) injuries sustained during training. The tables show separately individuals in A.1–(*i.e.* potentially A.1, but as yet sub-standard). A shift from A.1– to A.1 counts as an up-grading. No down-gradings took place in P.D.Cs. Hence, all cases recommended for down-grading have to be included in the *unchanged* group.

In assessing the significance of figures shown in this Section we must bear in mind two important qualifications: (*a*) we are not entitled to assume that standards of medical category remain unchanged in one and the same Centre, or are consistent for the three Centres as a whole; (*b*) there has been no comprehensive follow-up of men who have completed a course at a P.D.C. We cannot therefore be certain to what extent the up-gradings recorded are permanent or to what extent they are a just measure of improvement. Subject to these reservations, results obtained in the year and a half cited have been striking.

P.D.Cs. obtained their cases from two distinct sources: (*a*) Primary Training Centres or Ministry of Labour Boards, *i.e.* new recruits; (*b*) Other Units, *i.e.* soldiers with a record of service in the Army. In the following, the phrase *From Primary Training Centres* will include cases who go direct to a P.D.C. on the recommendation of a Ministry of Labour Board. During the period under review the proportion of total cases received in P.D.Cs. from Primary Training Centres rose steadily from approximately 75% to 90%.

Proportion of Total P.D.C. Cases Received from Primary Training Centres and from Other Units

		From P.T.Cs.	*From Other Units*	*All Cases*	*Crude Figures*
1944	1st Half	76·1	23·9	100·0	6,773
	2nd Half	85·8	14·2	100·0	6,885
1945	1st Half	89·3	10·7	100·0	7,126

The category-distribution of cases received from the two sources differs. *P.T.C.* cases are approximately evenly distributed between Categories A.1– and B.1; and there are only about 10% in other categories. Those from *Other Units* include a much higher proportion of A.2 and B.2 cases (*foot defects*) and a lower proportion of B.1 (*constitutional defects*).

Distribution of P.D.C. Cases by Initial Category and Type of Unit from which Received, January 1944-June 1945

	From P.T.Cs.	*From Other Units*	*All Cases*
A.1—	44·8	53·0	46·1
A.2	4·3	15·2	6·1
B.1	45·7	16·4	41·0
B.2	1·8	6·3	2·5
Others	3·4	9·0	4·3
Total	100·0	100·0	100·0
Crude Figures	17,425	3,359	20,784

Table 124 shows an overall picture of results achieved during the whole period. Over 20,000 men were dealt with, of whom 78% were up-graded. Of A.1– cases 88% "improved" (i.e. became A.1); and 75% of B.1 were up-graded (almost all to A.1). Table 125 shows separately for P.T.C. cases and others the proportions up-graded w.r.t. major categories during the three 6-monthly periods. In general, there was a rise of the percentage of each category up-graded between the 1st and 2nd halves of 1944 and a slight fall in the first half of 1945. This trend is more consistent w.r.t. cases from P.T.Cs. than to those from other units. Among P.T.C. cases, the proportion of A.1– up-graded rose to nearly 95% in the 2nd half of 1944 and was still over 90% in the first half of 1945. Over 75% of B.1 were up-graded and between two-thirds and three-quarters of A.2 and B.2 cases. Among cases received from other units the proportion up-graded is lower. A comparison between the two groups over the whole period appears below. All differences are statistically significant with the exception of the one relating to B.2.

Percentage Up-graded in P.D.Cs. by Initial Category and Type of Unit from which Received, January 1944-June 1945

	From P.T.Cs.	*From Other Units*	*All Cases*
A.1—	92·6	65·5	87·6
A.2	66·4	45·7	58·0
B.1	76·0	60·1	74·9
B.2	74·8	68·1	72·1
Other Categories	40·0	51·0	43·7
All Cases	81·8	60·5	78·3

Only 65% of A.1– from units other than P.T.Cs. were up-graded compared with over 90% for P.T.C. cases. With respect to B.1 the figures are 60% and 76% respectively. Men from units other than P.T.Cs. show a higher up-grading rate for *Other Categories*. This is because that item in this group refers mainly to B.7 and to C. Among men from P.T.Cs. it is made up largely of A.3 and A.4 (*eye defects*) which cannot be up-graded, even if a defect of locomotion or poor constitution is remedied. Net numerical changes of medical category resulting from courses in P.D.Cs. appear below:—

Net Numerical Increase (+) or Decrease (—) of Medical Categories in P.D.Cs., January 1944-June 1945

	1944 *1st Half*	1944 *2nd Half*	1945 *1st Half*	*Total*
A.1	+4,660	+5,507	+5,515	+15,682
A.1—	—2,467	—3,106	—2,822	— 8,395
A.2	— 160	— 177	— 109	— 446
B.1	—1,808	—2,043	—2,456	— 6,307
B.2	— 138	— 136	— 81	— 355
Other Categories	— 87	— 45	— 47	— 179

Bearing in mind the qualification mentioned w.r.t. possible relapse, these figures show that there has been a net gain of over 15,000 cases to A.1 during the year and a half covered, *i.e.* approximately 10,000 cases a year. This has been almost entirely at the expense of the A.1– and B.1 groups. If we take into consideration the fact that rather over 10,000 cases were treated in P.D.Cs. before the introduction of a uniform return at the end of 1943, we may swell figures in this table by some 50% to complete the record of P.D.Cs. throughout the war.

TABLE 124

General Recategorization Table (P.D.Cs.); Military Other Ranks, January 1944-June 1945

Initial Category	Numbers Treated	FINAL CATEGORY (as percentage of numbers treated in each category)														
		A.1	A.1—	A.2	A.3	A.4	A.5	B.1	B.2	B.2a	B.5	B.6	B.7	C.1 & C.2	Total Upgraded	Total Unchanged or Recommended for Downgrading
A.1—	9,585	87·6	**12·4**												87·6	12·4
A.2	1,263	58·0	—	**42·0**											58·0	42·0
A.3	190	5·3	—	0·5	**94·2**										5·8	94·2
A.4	147	2·0	—	—	1·4	**96·6**									3·4	96·6
A.5	10	—	—	—	—	50·0	**50·0**								50·0	50·0
B.1	8,518	73·5	—	1·3	0·0	0·0	—	**25·1**							74·9	25·1
B.2	523	40·1	—	22·2	—	0·8	—	9·0	**27·9**						72·1	27·9
B.2a	156	11·5	—	0·6	63·5	1·3	—	1·9	0·6	**20·5**					79·5	20·5
B.5	120	3·3	—	—	0·8	66·7	1·7	0·8	—	—	**26·7**				73·3	26·7
B.6	3	—	—	—	—	—	33·3	—	—	—	—	**66·7**			33·3	66·7
B.7	161	11·8	—	30·4	—	—	—	1·9	11·2	—	—	—	**44·7**		55·3	44·7
C.1 and C.2	108	30·6	—	5·6	—	0·9	—	20·4	2·8	—	—	—	2·8	**37·0**	63·0	37·0
Total	20,784														78·3	21·7

TABLE 125

Percentage Upgraded in P.D.Cs. by Initial Category and Unit from which Received; Military Other Ranks, January 1944—June 1945

	FROM P.T.Cs.			FROM OTHER UNITS			ALL CASES		
	1944 1st Half	1944 2nd Half	1945 1st Half	1944 1st Half	1944 2nd Half	1945 1st Half	1944 1st Half	1944 2nd Half	1945 1st Half
A.1—	91·7	94·3	91·6	58·4	74·5	67·0	83·0	91·1	88·0
A.2	60·5	68·6	70·5	46·9	54·9	29·0	53·3	64·1	58·4
B.1	69·4	80·8	77·2	59·9	57·8	65·8	68·3	79·4	76·9
B.2	73·1	80·2	69·4	72·0	65·3	63·4	72·5	74·6	67·5
Other Categories	38·8	35·6	46·4	58·3	47·2	41·9	46·7	38·6	44·9
All Cases	77·3	85·2	82·2	57·5	66·4	59·2	72·6	82·5	79·7

K

§3 HEIGHTS AND WEIGHTS OF ARMY INTAKES

INFORMATION in this section comes from a sample analysis, supplied by A.G. Co-ordination, of two intakes into the Army, one in October 1942 and the other in February 1944. In so far as it is reasonable to assume that heights and weights do not vary substantially *within any particular age group*, we can derive an overall picture of all recruits from the proportion of total intakes made up by each of the age groups cited. Relevant figures for the period July 1942-June 1945 were obtained through the War Office Personnel Selection Branch (S.P.2.); and the basic figures in each part of Table 126 were weighted appropriately in order to obtain overall figures (Table 128). For example, since 33% of total intakes during the period were 18 or under, the block of figures relating to this age group should contribute one third to the total, while the 19-year olds who made up only 18% of all recruits should contribute proportionately less to the overall total. Since the age distribution of the S.P.2 figures was not the same as that in Table 126, it was necessary to make certain adjustments before the appropriate contribution of each age group could be determined. It must be emphasized that figures in Table 128 refer only to the period defined and it is probable that the age-composition, and consequently the overall height and weight distribution, of recruits was quite different in the early part of the war, when age groups were being called up *seriatim*.

Figures in Table 127 show that the mean height for each age group specified did not vary materially from 5 ft. 7 inches. On the other hand, mean weight increased steadily from 9 st. 3 lb. among the 18-year olds to 9 st. 11 lb. among recruits over 32 years of age. Table 128 and Chart 21 show that 74% of all cases were 5 ft. 4 in.—5 ft. 9 in. high. Only 2% were over 6 ft. 1 in. and 7½% were less than 5 ft. 4 in. As regards weight, 75% were between 115 lbs. and 150 lbs., 10% weighed less, and 15% more. Only 2½% were over 170 lbs. (12 st. 2 lbs.). The lower half of Chart 21 shows how weight increases steadily with height and, to a more limited extent, with age. A second Chart (22) is based on results of two *ad hoc* investigations. Each half shows superimposed histograms of the relative frequency of different haemoglobin levels among two groups. That on the left (black) shows the generally higher level among intakes at the end of a course at the Physical Development Centre (Hereford). The one on the right shows that the haemoglobin level among a sample of serving A.T.S. Auxiliaries is higher than among a different sample of A.T.S. intakes. The two figures point to the same general conclusion that the dietary regimen of the Army at that time was corrective to such anaemia as is prevalent in the civilian population.

TABLE 126

Height and Weight Distribution per 1,000 of Sample Intakes

(*a*) Age 18 years

Height in inches	Weight in pounds: 99 and under	100–114	115–129	130–149	150–169	170 and over	Total
60 and under	1	2	2	—	—	—	5
61-63	3	36	21	2	—	—	62
64-66	2	70	165	64	2	—	303
67-69	—	23	179	211	28	2	443
70-72	—	1	28	94	38	5	166
73 and over	—	—	1	8	10	2	21
Total	6	132	396	379	78	9	1,000

(*b*) Age 19 years

Height in inches	Weight in pounds: 99 and under	100–114	115–129	130–149	150–169	170 and over	Total
60 and under	8	6	1	—	—	—	15
61-63	3	35	25	5	—	—	68
64-66	2	48	159	79	7	—	295
67-69	—	14	155	212	36	2	419
70-72	—	1	26	102	40	5	174
73 and over	—	—	—	9	15	5	29
Total	13	104	366	407	98	12	1,000

TABLE 126 (*contd.*) **Height and Weight Distribution per 1,000 of Sample Intakes**

(*c*) Age 20-31 years

Height in inches	Weight in pounds: 99 and under	100–114	115–129	130–149	150–169	170–189	190 and over	Total
60 and under	—	3	1	—	—	—	—	4
61-63	1	20	27	11	—	—	—	59
64-66	1	31	144	115	17	1	—	309
67-69	—	8	113	241	66	10	2	440
70-72	—	—	11	77	61	13	4	166
73 and over	—	—	—	9	11	2	—	22
Total	2	62	296	453	155	26	6	1,000

(*d*) Age 32 years and over

Height in inches	Weight in pounds: 99 and under	100–114	115–129	130–149	150–169	170–189	190 and over	Total
60 and under	—	4	4	2	1	—	—	11
61-63	—	23	41	16	3	—	—	83
64-66	1	37	141	142	33	4	—	358
67-69	—	8	93	198	69	17	4	389
70-72	—	—	9	62	52	16	4	143
73 and over	—	—	—	3	7	3	3	16
Total	1	72	288	423	165	40	11	1,000

TABLE 127

Mean Height, Mean Weight and Proportions of Total Intake within each Age Group ; July 1942-June 1945

Age	Mean Height (inches)	Mean Weight (pounds)	Proportion of Total Intakes
18 years	67·30	129·4	33·4
19 years	67·27	131·2	18·4
20-31 years	67·30	136·5	27·8*
32 years and over	66·84	137·3	20·4*
All Ages	67·20	133·3	100·0

* Estimated from available figures to conform with age groups here used.

TABLE 128 **Estimated Height and Weight Distribution of All Intakes per 1,000 ; July 1942-June 1945**

Height in inches	Weight in pounds: 99 and under	100–114	115–129	130–149	150–169	170 and over	Total
60 and under	2	3	2	—	—	—	7
61-63	2	29	27	8	1	—	67
64-66	2	48	153	97	13	1	314
67-69	—	14	139	217	48	9	427
70-72	—	1	19	84	48	11	163
73 and over	—	—	—	8	11	3	22
Total	6	95	340	414	121	24	1,000

Part VI. THE RELATION OF AGE TO WASTAGE

§1 MEDICAL DISCHARGES

IT has long been customary for civil public health offices to *standardize* death rates with respect to age; but no such procedure has hitherto been adopted for Army discharge and sickness rates. Age standardization is an arithmetical correction designed to forestall erroneous conclusions which arise from the fact that the proportions of people in different age groups change as the result of changing mortality and fertility, of immigration and of emigration. What applies to civilian death rates applies to Army morbidity and discharge rates, the more so because the age composition of an Army can change very considerably during a war. As yet few reliable figures concerning age distributions of the *onset* of diseases are available. Civilian statistics are necessarily defective, because it is impossible to define with sufficient precision the age composition of the population from which a civil hospital recruits its patients; and no study of the kind has hitherto been made on a military population for which the basic data are to hand. From the standpoint of Army medical policy such information is of value as a bases for:

(*a*) policy with respect to selection of age groups *vis-a-vis* the special risks to which they may be exposed;
(*b*) intelligent anticipation of consequences arising from the changing age structure of the Army (Charts 23-24) as the result of changing methods of recruitment, or of changes with respect to the type of recruit available;
(*c*) standardizing morbidity and discharge rates with a view to correct appraisal of apparently significant changes and differentials disclosed by crude figures.

As concerns the last in particular, the aim of Part VI is to provide basic data for correct interpretation of statistics for the Official Medical History of the War. This section deals with discharge rates. Up to a point, discharge like death is a measure of the gravity of disease or of a stage in its course. So the age-variation of a discharge rate, as of a death rate, involves the relation between age and (*a*) the gravity of a disease, (*b*) its incidence. There is, however, this difference. Death due to disease does not directly depend on an administrative decision which may be influenced by the age of the individual concerned. If the only issues involved were academic, it would therefore be preferable to present the results of an investigation into the relation of age to morbidity (*i.e.* hospitalization statistics) before issuing the results of this one; but materials for analysis of discharge rates are, in fact, more reliable if only because a corresponding analysis of hospitalization statistics presupposes use of reliable strength-age distributions for *individual* theatres; and the need for such figures was not recognized during the earlier part of the war. The documentary source of material here presented is A.F. B3978 w.r.t. Military O.Rs. and A.T.S. auxiliaries for the year 1943, or, if so indicated by an asterisk, for 1943 and 1944. Data for the strength-age distributions used as a yardstick of the true populations at risk were supplied by the Adjutant General's Statistical Branch (A.G. Stats.). It is still customary for medical treatises to cite figures for proportions of cases examined in different age groups as an indication of the liability of individuals in such age groups to contract a particular disease. This practice is misleading, since it takes no account of the fact that the population at risk in one group is not necessarily the same size as the population at risk in another, and may, in fact, be much greater or much less. It is particularly misleading to base judgments about how the risk of contracting a disease varies with age on a sample drawn from the Army. How much so, the histograms in Chart 25 sufficiently emphasize. In this Chart, and in others which follow it, the convention of super-imposition of two distributions calls for explanatory comment. The height of the *solid* black (*males*) or red (*females*) part of a column represents the value of the ordinate common to both distributions. The area shaded represents the excess of the numerically greater ordinate over the smaller of the two. Thus the total height (solid and shaded parts) of the column stands for the greater ordinate, the height of the solid part for the lower. The choice of shading, as specified on the chart itself, indicates which of the two distributions has the greater value for the age group represented by a particular column.

The just measure of the risk of contracting a disease in any age group is the incidence of the disease therein, *i.e.* the ratio of cases to the total number of individuals within the age group. If c_x is the number of cases in the *x*th age group, and p_x the corresponding strength, the absolute incidence $I_x = c_x \div p_x$. For purposes of comparing the age distributions of different diseases or age distributions of the same disease among males and females, it is convenient to reduce them to the same vertical scale by using the *relative incidence* R_x, defined as follows. If T_i is the sum of $I_1, I_2 \ldots$ etc.:

$$R_x = 100\ I_x \div T_i$$

This has the effect of making the areas of all histograms in the accompanying charts the same without affecting the characteristic shape of any. For any given distribution successive values of $R_1, R_2, R_3 \ldots$ etc., are in the same ratios as $I_1, I_2, I_3 \ldots$ etc.; and have an advantage over the latter other than the one already stated, in so far as they are reliably calculable from sampling in the absence of data necessary for the determination of absolute figures.

The data here tabulated or presented in the accompanying charts supply information relevant to the following questions:

(*a*) how far impressions concerning the relation between age and liability to discharge based on numbers discharged in different age groups can be distorted by the peculiar composition of the Army population;
(*b*) how far variation of age with liability to discharge reflects intrinsic changes which occur in the life cycle of the individual;
(*c*) how far variation of age with liability to discharge is influenced by intrinsic difference between the sexes;
(*d*) which diseases are more or less important as sources of wastage in different age groups of the Army population;
(*e*) how changes with respect to the age composition of the Army during the present war distort the impression conveyed by the trend of crude discharge rates.

The first of these questions has been touched on above. It would scarcely be necessary to refer to it at all, were it not for the frequency with which unjustifiable statements circulate with reference to the relation of clinical or other phenomena to both age and length of service. As Chart 25 shows, the crude impression concerning relative liability to discharge at different ages, gained from first hand experience of the numbers discharged at different ages, may be the exact opposite to the true state of affairs. In this chart each left-hand item shows respectively above and below the base line histograms for the age-incidence distributions defined by R_x, and the percentage of cases actually observed in corresponding age groups (*i.e.* < 22, 22-24, 25-27, 28-30, 31-33, 34-36, 37-39, 40-42, 43-45, and > 45).

Tables 129 and 130 show the relative incidence of discharges in these age groups for those diseases which make up over 75% of discharges on account of sickness during the period specified above. The distributions there shown fall into two main categories respectively characterized by:

(*a*) A *uniform trend* with a peak at the latter end of the age range, as is notably true of *Chronic Bronchitis*, *Peptic Ulcer*, *Malignant Neoplasms*, *Dyspepsia* and *Gastritis*, *Diabetes Mellitus*, *Otitis Media*, *Sciatica*, *Manic Depressive Psychosis* and *Anxiety State* (Chart 28).

(*b*) *No* such striking uniformity, as is notably true of *Valvular Disease of the Heart*, *Epilepsy* (Chart 27). *Psychopathic Personality*, *I.D.K.*, and *Schizophrenia*,

Distributions of the first class, as illustrated by the separate histograms for *Malignant Neoplasms* and *Chronic Bronchitis* in Chart 26, as also by the superimposed histograms for *Gastric* and *Duodenal Ulcer* in the same chart, conform to a rule abundantly supported by analysis of age-variation with respect to hospitalization rates (§2). In general, a clear-cut clinical entity has a clear-cut age-incidence distribution with a peak at the beginning of life, towards the end of life, or at both ends. The absence of any definite trend in the figures for *Valvular Disease of the Heart* (*V.D.H.*) and *Psychopathic Personality* (Chart 28) illustrates the converse rule that the age-incidence distribution of a disease which is not a clear-cut clinical entity does not show a uniform trend. Three diseases which are themselves distinct aetiological entities call for comment in this connection. Hospitalization data for *Rheumatic Fever* show a steady fall of incidence with advancing age. After a sharp drop in the age group 22-24 there is no steady fall of the discharge rate. It is possible that the discrepancy is due to the inclusion in discharge figures of cases suffering from cardiac complications of an attack which actually took place some years before, a view which receives some support from comparison between age-discharge distributions for Rheumatic Fever and for V.D.H. A secondary rise of the discharge rate for *Poliomyelitis* (including *Polioencephalitis*) at the latter end of the age range is not statistically reliable owing to the small sample and hence the very small numbers in the older age group. In any case, comparison of numbers discharged with numbers hospitalized shows that many cases recommended for discharge on account of poliomyelitis are so recommended for the after effects of acute attacks at a *much earlier date*. Tuberculosis calls for special comment in connection with sex differences below. *Epilepsy* is one outstanding exception to the rule illustrated by distributions of Class (*a*). Peculiarities of its distribution may be reasonably attributed in part to the fact that it is a congenital diathesis whose manifestations may be long delayed and in part to the weeding-out of recruits who pass civilian medical boards without detection. The other outstanding anomaly is *Foot Deformities*, a heterogeneous assemblage with a remarkably uniform trend of increasing incidence as age advances. Why this should be so invites further enquiry, in so far as it may point to a danger in delayed treatment of minor defects. It we apply the above criterion of clinical homogeneity to the psychiatric disorders, we are led to doubt whether *Schizophrenia* (Chart 27) is a singular clinical phenomenon.

The superimposed histograms of *Duodenal* and *Gastric Ulcer* present a picture which tallies with hospitalization data (Army Form I1220), confirming the general clinical impression that the age of onset of duodenal ulcer is somewhat earlier than that of gastric ulcer. The incidence of the latter increases steeply over the whole age group. That of duodenal ulcer, on the other hand, has its peak in the quinquennium 40-45 and declines thereafter. For one disease hospitalization rates (§2) fall out of step with discharge rates. *Acute Otitis Media* has a young age distribution comparable with rheumatic fever. The incidence of hospitalized cases of *Chronic Otitis Media* is about the same in all age groups. The discharge rates rise steadily with advancing age. Whether this difference is due to greater gravity of the disease as age advances, or to greater readiness of Medical Boards to recommend for discharge chronic cases in the older age groups, is uncertain. The uniformity of the trend suggests the former rather than the latter.

Broadly speaking, the distributions for males (Table 129) and females (Table 130) tally closely. Two differences call for comment. One is the relative excess of female discharges with respect to *Manic Depressive Psychosis* and *Anxiety State* in the menopausal age group (over 40). The other difference provokes further inquiry. Among auxiliaries, age variation with respect to the discharge rate for *Pulmonary Tuberculosis* is in accordance with the general rule for infectious diseases as is also true of *Tuberculosis at Other Sites* among males. That is to say, the younger are most affected. There is, however, a significant secondary rise of the male discharge rate in the older age groups. Conversely, pulmonary tuberculosis among males and T.B. at Other Sites among females present a picture of increasing risk as age advances. A further breakdown of the male figures by excluding pleurisy with effusion from the sample of phthisical cases and by excluding genito-urinary cases from the sample of T.B. at other sites, reinforces the contrast. Unfortunately, the female sample for T.B. at other sites is small. So the sampling error on the individual ratios is comparatively large.

Table 131 summarizes available data with respect to which diseases are more or less important as a source of wastage in different age groups of the army population. In the age group under 28, *Psychiatric* and *Nervous* disorders account for nearly half of all discharges. If we add *Peptic Ulcers*, *Tuberculosis*, *Bronchitis*, *Otitis Media* and *Asthma* we have accounted for nearly 75% of all discharges within this age group; and of those included tuberculosis is by far the most noteworthy item in the age group under 22. In the 40-45 age group, psychiatric and nervous disorders on the one hand, and diseases other than those mentioned above on the other, each account for almost exactly one-third of all discharges, and peptic ulcers together with bronchitis for a quarter. The over-45 age-group tells quite a different story. *Bronchitis* alone accounts for about one-fifth of all discharges. It is a more important source of wastage than psychiatric and nervous disorders. Diseases other than those specifically mentioned in this context now account for more than half the total discharges. Broadly speaking we may summarize the contents of Table 131 and Chart 29 thus:

(*a*) if the youngest age groups of an army population predominate, the major sources of wastage are *Psychiatric disorders* and *Tuberculosis*;

(*b*) if the middle age groups predominate, the major sources of wastage are *Psychiatric disorders* and *Peptic Ulcers*;

(*c*) if the oldest age group were to predominate, the major sources of wastage would be *Bronchitis* and *Psychiatric disorders*.

The conclusions presented in Tables 129-131 have a profound bearing on the interpretation of the trend of crude discharge rates during the war because the age composition of the army has changed considerably since 1939 (Chart 30). The two main features of this change are:

(i) a steady fall of the proportion of very young men;

(ii) a concomitant decrease of the proportion in the oldest (over 45) age group.

The effect of this may be such as would wholly invalidate impressions gained from the trend of crude discharge rates w.r.t. individual diseases, if the risk of contracting them or the gravity of their manifestations rises or falls steadily as age advances; but if the incidence of a disease increases very sharply at the tail end of life the distortion is less conspicuous. If we know how the incidence of discharge varies with respect to age we can make an appropriate correction to eliminate such false impressions by means of the statistical device known as *age standardization*. The data in Tables 129 and 130 provide us with the means of calculating age-standardizing factors as shown in Tables 132 and 133 for the computation of *Standard Rates* by the *indirect* method. A standard rate in this context means what the crude rate would be if the population had a standard age composition, here taken to be that of military O.R.s at June, 1940, or of A.T.S. auxiliaries at June, 1941. To obtain them we merely have to multiply the crude discharges of a given year by the appropriate standardizing factor. An example will make this procedure clear. The 1944 standardizing factor for duodenal ulcer (males) is 0·758, or roughly $^3/_4$ This means that we have to reduce the crude rate for 1944 by one-quarter or 25% to make the 1944 figure strictly comparable with the 1940 figure. In other words, the ageing of the army population during this period would itself have sufficed to raise the crude rate in the ratio 4 : 3, *i.e.* to bring about a 33% increase so that if the crude rate had gone up 25% between 1940 and 1944 the real risk w.r.t. *Duodenal Ulcer* would have gone down during the same period. The indices in Table 132 and Table 133 make it possible for the first time to see in their true perspective what changes have occurred during the course of the war. They are immediately instructive for another reason. The A.T.S. is a much younger population than military personnel. Hence, it is possible for age alone to invalidate judgments with respect to sex differentials based on crude rates. Two such differentials concern peptic ulcers and bronchitis, which stand high on the list of major sources of wastage in the male army population, but are relatively unimportant in the A.T.S. To make the 1944 figures strictly comparable, we have to refer them to the same standard population. If the standard population is the male population of 1940 we have to multiply the 1944 A.T.S. figures for Bronchitis (Table 133) by 1·970, and the 1944 military bronchitis rate (Table 132) by 1·071. This approximately halves the ratio of the male to the female discharge rate. Similarly, we have to multiply the crude male and female rates for peptic ulcer by 0·763 and 1·435 respectively; and this again reduces the male to female ratio by nearly 50%. In either case, a real difference remains when we have done so, and the difference with respect to discharges for peptic ulcer is still spectacular. The difference with respect to bronchitis is *not*.

TABLE 129 Relative Age-Incidence Distributions; Military Other Ranks

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Sample Size
Bronchitis—Chronic	0·34	0·49	0·75	1·11	2·07	2·98	5·83	12·01	22·45	51·97	100·00	2,181
Asthma	5·70	3·83	5·35	8·01	8·10	10·22	10·66	14·72	16·95	16·45	100·00	543
Gastric Ulcer	1·51	1·98	2·71	4·34	5·90	9·75	12·61	16·71	19·38	25·12	100·00	995
Duodenal Ulcer	2·21	3·33	4·59	7·35	8·78	10·96	13·21	16·76	17·49	15·30	100·00	4,665
Peptic Ulcers—All	2·06	3·03	4·15	6·63	8·13	10·62	13·08	16·92	17·98	17·41	100·00	5,843
Dyspepsia and Gastritis	0·85	1·05	2·11	2·77	3·91	5·66	8·81	12·16	20·12	42·55	100·00	487
Otitis Media	5·65	5·51	6·53	8·15	9·40	9·46	8·73	12·49	14·31	19·75	100·00	1,305
*Rheumatic Fever	20·98	9·36	9·25	5·42	9·88	9·39	8·73	9·46	9·17	8·35	100·00	303
*T.B. Pulmonary (Excl. Pleurisy)	8·81	8·02	7·72	6·80	6·70	8·26	9·56	11·08	16·02	17·03	100·00	4,700
*T.B. Pulmonary	11·20	8·70	8·03	6·92	6·70	7·88	9·01	10·55	14·78	16·23	100·00	5,713
*T.B. Other Sites	16·18	10·27	10·40	10·09	8·12	8·52	8·72	7·57	9·58	10·55	100·00	968
*T.B. All	11·81	8·90	8·32	7·30	6·88	7·96	8·97	10·20	14·16	15·50	100·00	6,681
Neoplasms—Malignant	2·06	1·73	1·99	2·31	4·81	6·75	9·23	14·61	24·20	32·32	100·00	349
Neoplasms—Benign and Unspecified	3·87	3·76	3·47	8·27	3·16	8·25	9·60	14·60	18·69	26·32	100·00	100
V.D.H.	9·67	7·70	7·76	7·18	8·04	8·53	11·82	13·81	13·01	12·48	100·00	777
Foot Deformities	3·20	2·22	3·44	5·15	7·91	11·00	10·94	15·79	16·45	23·90	100·00	613
*Poliomyelitis	10·25	12·52	8·90	7·78	5·95	7·60	8·89	7·46	15·12	15·54	100·00	215
Nephritis	5·91	4·38	4·72	6·85	6·71	5·92	13·03	14·46	18·49	19·53	100·00	268
*Hernia	0·39	0 31	0·47	1·24	1·67	2·91	5·31	10·04	14·56	63·10	100·00	367
*I.D.K.	3·78	5·72	8·36	9·85	11·79	11·87	12·84	12·31	8·53	14·95	100·00	431
Diabetes Mellitus	5·01	5·66	6·31	6·11	4·94	7·41	7·67	11·57	17·17	28·15	100·00	507
Disseminated Sclerosis	4·15	5·53	4·96	8·94	12·93	11·22	9·76	15·53	6·10	20·89	100·00	237
Sciatica	1·41	1·90	2·32	3·42	5·95	7·96	12·44	20·36	18·91	25·31	100·00	413
*Epilepsy	21·50	10·40	8·87	8·38	8·70	8·74	8·99	10·55	9·11	4·76	100·00	2,224
Mental Deficiency	14·73	6·06	5·75	5·84	5·88	7·86	9·58	15·18	14·96	14·16	100·00	1,098
Anxiety State	2·91	3·54	4·57	5·71	7·11	9·09	11·04	16·00	19·33	20·70	100·00	6,325
Psychopathic Personality	12·13	8·21	7·70	8·23	7·58	8·57	9·58	11·27	15·45	11·28	100·00	2,774
Manic Depressive Psychosis	3·24	3·83	4·68	6·33	7·61	9·83	12·27	17·44	16·91	17·86	100·00	992
Hysteria	8·68	5·01	5·36	6·36	8·00	9·33	10·76	15·07	19·07	12·36	100·00	3,282
Schizophrenia	18·66	12·84	9·89	8·63	9·60	8·79	9·28	8·92	5·89	7·49	100·00	1,017
*Paranoid State	0·21	1·16	1·25	4·72	4·19	5·66	11·18	14·23	31·94	25·45	100·00	140
Obsessional State	4·41	5·89	8·32	8·14	8·24	7·96	15·32	12·95	21·30	7·47	100·00	237

* Sample includes cases for 1944.

TABLE 130

Relative Age-Incidence Distributions; A.T.S. Auxiliaries

	<22	22-24	25-27	28-30	31-33	34-36	37-39	> 39	Total	Sample Size
*Bronchitis—Chronic	1·78	1·76	4·00	4·96	11·96	6·25	23·99	45·32	100·00	135
*Peptic Ulcers—All	4·28	3·73	5·39	15·04	7·20	10·54	28·32	25·49	100·00	129
*T.B. Pulmonary (Excluding Pleurisy)	19·42	16·93	17·50	16·63	10·76	13·15	3·30	2·31	100·00	493
*T.B. Pulmonary	20·00	17·30	18·17	13·30	10·59	11·29	2·52	6·82	100·00	678
*T.B.—Other Sites	17·26	13·57	13·17	15·77	18·09	22·13	—	—	100·00	169
*T.B.—All Types	19·33	16·41	17·01	13·83	12·28	13·74	1·94	5·44	100·00	847
*Epilepsy	27·39	17·98	15·22	14·18	5·41	19·82	—	—	100·00	256
Mental Deficiency	11·43	6·68	5·43	14·03	16·55	23·81	7·08	15·00	100·00	127
Anxiety State	2·80	3·90	5·14	8·84	11·14	16·47	22·38	29·34	100·00	636
*Psychopathic Personality	9·28	5·85	9·44	11·23	14·42	20·00	13·83	15·94	100·00	823
*Manic Depressive Psychosis	5·41	5·25	7·84	13·07	13·24	15·77	18·60	20·83	100·00	345
Hysteria	8·55	5·89	9·67	9·51	16·85	18·16	16·13	15·24	100·00	636
*Schizophrenia	8·34	6·42	11·33	15·34	14·86	18·13	9·30	16·27	100·00	179

*Sample includes cases for 1944.

TABLE 131

Relative Discharge Rates in 6-year Age Groups ; Military O.Rs., 1943

	Under 22	22–27	28–33	34–39	40–45	Over 45	All Ages
Psychiatric and Nervous Disorders	49·6	44·6	40·5	36·9	32·6	17·4	39·6
Peptic Ulcers	5·8	11·4	16·1	16·7	13·8	6·5	13·3
Tuberculosis	12·5	10·3	5·8	5·1	3·8	2·0	7·0
Bronchitis	1·0	2·0	3·4	5·9	11·4	19·4	5·1
Otitis Media	3·0	3·6	3·6	2·5	1·9	1·4	3·0
Asthma	1·3	1·2	1·5	1·2	1·0	0·5	1·2
Malignant Neoplasms	0·5	0·5	0·7	1·0	1·2	1·1	0·8
Other Diseases	26·2	26·4	28·5	30·6	34·2	51·7	30·1
Total	100·0	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 132 **Annual Age Standardizing Factors; Military Other Ranks**

	1940	1941	1942	1943	1944		1940	1941	1942	1943	1944
Bronchitis—Chronic	1·000	1·153	1·066	1·199	1·071	Poliomyelitis	1·000	1·049	1·079	1·102	1·116
Asthma	1·000	0·979	0·929	0·915	0·880	Nephritis	1·000	1·015	0·983	0·976	0·940
Gastric Ulcer	1·000	0·977	0·859	0·844	0·810	Hernia	1·000	1·174	1·106	1·306	1·187
Duodenal Ulcer	1·000	0·928	0·828	0·804	0·758	I.D.K.	1·000	0·919	0·850	0·837	0·811
Peptic Ulcers—All	1·000	0·937	0·834	0·811	0·763	Diabetes Mellitus	1·000	1·022	1·005	1·028	1·006
Dyspepsia and Gastritis	1·000	1·042	0·945	0·987	0·907	Disseminated Sclerosis	1·000	0·938	0·865	0·851	0·825
Otitis Media	1·000	0·977	0·938	0·936	0·913	Sciatica	1·000	0·996	0·871	0·851	0·784
Rheumatic Fever	1·000	1·107	1·197	1·196	1·222	Epilepsy	1·000	1·096	1·184	1·183	1·210
T.B. Pulmonary (excluding Pleurisy)	1·000	1·037	1·045	1·053	1·046	Mental Deficiency	1·000	1·092	1·152	1·148	1·146
T.B. Pulmonary	1·000	1·057	1·088	1·099	1·101	Anxiety State	1·000	0·975	0·896	0·885	0·839
T.B.—Other Sites	1·000	1·052	1·109	1·118	1·136	Psychopathic Personality	1·000	1·047	1·075	1·075	1·074
T.B.—All	1·000	1·056	1·091	1·102	1·106	Manic Depressive Psychosis	1·000	0·967	0·885	0·867	0·824
Neoplasms—Malignant	1·000	1·055	0·965	0·977	0·902	Hysteria	1·000	1·033	1·018	1·002	0·976
Neoplasms—Benign	1·000	0·998	0·948	0·956	0·915	Schizophrenia	1·000	1·074	1·140	1·146	1·174
V.D.H.	1·000	1·031	1·031	1·025	1·015	Paranoid State	1·000	0·980	0·852	0·849	0·761
Foot Deformities	1·000	0·976	0·885	0·868	0·818	Obsessional State	1·000	0·957	0·905	0·890	0·857

TABLE 133

Annual Age Standardizing Factors ; A.T.S. Auxiliaries

	(*a*) w.r.t. Military Strength, 1940				(*b*) w.r.t. A.T.S. Strength, 1941			
	1941	1942	1943	1944	1941	1942	1943	1944
Bronchitis—Chronic	1·067	1·732	2·018	1·970	1·000	1·624	1·892	1·847
Peptic Ulcers—All	1·048	1·329	1·442	1·435	1·000	1·268	1·375	1·369
T.B. Pulmonary (excluding Pleurisy)	0·969	0·900	0·900	0·914	1·000	0·929	0·929	0·944
T.B. Pulmonary	0·965	0·899	0·899	0·915	1·000	0·932	0·932	0·949
T.B.—Other Sites	0·964	0·912	0·925	0·948	1·000	0·946	0·960	0·983
T.B.—All Types	0·964	0·902	0·905	0·922	1·000	0·935	0·938	0·956
Epilepsy	0·909	0·815	0·833	0·880	1·000	0·896	0·916	0·967
Mental Deficiency	0·958	1·003	1·068	1·121	1·000	1·047	1·115	1·170
Anxiety State....	1·144	1·571	1·677	1·615	1·000	1·373	1·465	1·411
Psychopathic Personality	0·996	1·080	1·150	1·181	1·000	1·085	1·155	1·186
Manic Depressive Psychosis	1·050	1·250	1·315	1·297	1·000	1·191	1·253	1·235
Hysteria	1·008	1·105	1·169	1·190	1·000	1·097	1·161	1·181
Schizophrenia	1·023	1·120	1·176	1·180	1·000	1·095	1·150	1·154

§2 HOSPITAL ADMISSIONS IN THE U.K.

FOR reasons stated in §1, it would have been preferable to present first the results of analysis of data supplied by A.F.I 1220, since hospitalization may be taken as a measure of the risk of contracting a disease at a given age uncomplicated by prevalent policy with reference to the service value of an individual. An obstacle to doing so has been the difficulty of obtaining a satisfactory estimate of the populations at risk. Data with reference to medical discharges refer to the Army as a whole; and strength returns by years of birth are available for the whole period of the war. The distribution of risk with respect to age is not the same in different theatres, and it is therefore proper to analyse A.Fs.I 1220 separately for each theatre. The ensuing section refers to the United Kingdom for the calendar year of 1943. Until the reorganization of Army medical statistics, need for certain basic statistical information with a view to correct interpretation of medical data was not brought before the attention of A.G. Stats., who responded promptly to representations with that end in view. Consequently, returns of age distributions by theatre were not available for this analysis and it has been necessary to make an estimate of the age distribution of the population at risk for the purpose of what follows.

As a first approximation (I) we might take the 1943 age distribution of the Army in United Kingdom to be that of the Army as a whole in the same year, when in fact about 60 per cent. of it were still at home. As a second approximation (II), we may estimate what it would have been, if the only relevant selective process involved in dispatch to overseas commands had been the exclusion of the age group under 19. Clearly, the first approximation under-estimates the relative strength of the youngest age group and would therefore lead one to compute unduly high values of the relative incidence of diseases therein. The alternative supposition takes no cognizance of the exclusion of category C personnel among whom we have sufficient reason to infer a preponderance of the older age groups. It therefore under-estimates the size of the latter in the residual (United Kingdom) population, and hence would lead to unduly high values of the relative incidence of diseases in the older part of the age-range.

In fact, the computation of age incidence distributions for the diseases cited below on the basis of either approximation leads to results which do not greatly differ. It is, however, possible to arrive at an estimate which is better than either of the foregoing. By comparison between the age-strength distributions of the Army in the United Kingdom and the Army as a whole as at March 1945, with due consideration to the ratio of total home and overseas strengths, one can infer the age distribution of the segment of the Army population excluded from overseas service above the age of 19. This presumably represents the age distribution of personnel rejected on account of low medical category. Above the age of 22 this distribution is approximately parabolic. If we reject the age group under 19 as before, a quadratic formula convenient for computation leads to a fit good enough for the purpose in hand:

U.K. 1945	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	*Total*
Calculated	21·2	9·9	12·2	12·7	12·5	11·1	9·2	6·2	3·3	1·7	100
Actual	20·9	10·2	12·6	13·4	12·6	10·7	8·6	5·9	3·4	1·7	100

A third and better approximation (III) than either of those cited above is therefore possible on the assumption that the age distribution of personnel rejected for overseas service as too young or of too low medical category was in June 1943 much the same as in March 1945, and to that extent in accordance with the formula used for computing the upper distribution of the preceding table. The three estimates for the United Kingdom Army in 1943 shown below do not differ grossly:

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	*Total*
I	15·1	18·7	16·9	15·6	13·0	9·2	6·1	3·6	0·9	0·9	100
II	16·8	18·3	16·5	15·3	12·7	9·1	6·0	3·5	0·9	0·9	100
III	17·2	16·5	15·3	14·6	12·9	9·7	6·8	4·4	1·2	1·3	100

For what follows, the estimated age-strength distribution of the United Kingdom Army (military personnel) is the last, which is almost certainly nearer to the correct one than are either of the other two. The general conclusions stated in the text below are in fact consistent with distributions calculated on *any of the three* assumptions specified; and it is happily possible to get a check on the procedure adopted by comparing age incidence distributions of discharges and hospital admissions with reference to sufficiently common diseases which almost invariably lead to discharge, notably PEPTIC ULCERS and PULMONARY T.B. The correspondence shown in Table 136 and Chart 32 is highly satisfactory. For the women's service, the total distribution serves well enough for the United Kingdom, because the fraction serving overseas was negligible.

In this section, as elsewhere, age-incidence distribution has the same significance as in §1. The figures are in the same ratio as those for absolute incidence in successive age groups, but are all reduced to the same percentage scale defined by R_x. The most striking feature of Table 134 is the contrast between the age-incidence distributions of acute infections on the one hand and of non-communicable diseases or chronic infections on the other. With few exceptions mentioned below, the general rule is that the incidence of acute infections falls off with increasing age and most steeply in the youngest age groups (*cf.* DIPHTHERIA, Chart 31). To the extent that an attack confers more or less immunity, this is intelligible. The residual proportion not immunized by previous attack must fall off in successive years of life, and the effective population at risk therefore becomes successively smaller than the total strength in a given age group. If this is a sufficient explanation of the phenomenon, two conclusions follow. *Ceteris paribus*, the decline of incidence with advancing age should be:

(*a*) less steep if the disease is more rare;

(*b*) more steep if a single attack suffices to confer complete immunity, as is supposedly true of most *virus* diseases.

It is therefore suggestive that:

(*a*) *rubella*, *measles*, *mumps* and *chickenpox* show the steepest decline of diseases listed;

(*b*) Of these virus diseases *rubella*, which is the most common, also shows the steepest fall;

(*c*) in contrast with that of *scarlet fever*, the age incidence of *erysipelas*, likewise a haemolytic streptococcal infection but one which confers little or no immunity, does not in fact decline as age advances. On the contrary, it steadily increases.

In this respect, INFECTIVE HEPATITIS conforms to the general behaviour of virus diseases. The age incidence of POST-ARSPHENAMINE JAUNDICE (related to the correct population at risk, *i.e. syphilitics*) is altogether different. This fact, as also the different seasonal distributions and incubation periods (*vide infra* Part X. §5) of the two diseases, is strong evidence against the prevalent though insufficiently established, belief that the same virus is responsible for both of them.

Exceptions to the general rule under discussion are GONORRHOEA, SYPHILIS, PULMONARY TUBERCULOSIS and PNEUMONIA (*lobar and secondary*). For obvious reasons it is not necessary to specify *scabies* as such, since its inclusion in the table as a communicable disease is merely a matter of convenience. It is known that an attack of *gonorrhoea*, like an attack of erysipelas, confers little, if any, immunity; and that *syphilitics* treated early with arsenicals, as was then common practice, can be subsequently re-infected. *Pulmonary tuberculosis* is a protracted disease which may long remain latent and become manifest under conditions of stress. *Lobar pneumonia* is attributable to a variety of distinguishable types and of strains within one and the same type. *Secondary* pneumonias constitute an even more heterogeneous assemblage. It is therefore arguable that exceptions to the rule stated are more apparent than real; and that they are indeed the sort of exceptions that prove the rule. Since death (or discharge) removes from the apparent population at risk individuals who might otherwise be immune to subsequent attack, the considerations advanced above do not apply to a wholly and rapidly fatal disease, and apply with less force to any disease which has a high fatality—as have T.B. and Pneumonia. Among diseases which are not communicable, the only examples of steeply decreasing incidence with advancing age are SCHIZOPHRENIA (*vide infra*) and APPENDICITIS. In the absence of more information about the aetiology of the latter, comment thereon would be premature; but the prevalence of operative removal of the appendix signifies the diminishing proportion of potential sufferers from this complaint in later age groups.

Of two diseases supposedly due to infection, *rheumatic fever* conforms to the general rule stated above. Evidence concerning the origin of acute *nephritis* is more conflicting, its singularity as a clinical entity is more dubious, and its age distribution is not typical of communicable diseases.

The remaining organic (excluding *nervous*) disorders listed fall into two groups:

(*a*) *peptic ulcers*, *malignant neoplasms* and *chronic bronchitis*;
(*b*) *asthma*, *hernia* and *benign neoplasms*.

The incidence of *gastric ulcer* and *chronic bronchitis* increases steeply with advancing age to the limit of the range. That of *duodenal ulcer* initially increases more steeply than that of gastric ulcer, but attains a peak about 44 years of age. The incidence of *bronchitis* among discharges increases more steeply with age than that of hospital admissions. The latter are far in excess of the former. We may therefore infer that discharge with reference to chronic bronchitis includes only more serious cases among those represented by hospital admissions. The fact that it is a steadily progressive disease and the greater likelihood of emphysema among the oldest age groups might thus suffice to account for the observed disparity. To some extent, greater reluctance to recommend for discharge younger soldiers may also contribute thereto.

Since *asthma* depends on a congenital diathesis which may become manifest at an early age, it is not surprising that it exhibits no striking age-incidence trend among hospital admissions. That it shows increasing relative frequency with advancing age among medical discharges is possibly explicable in terms of administrative rather than clinical considerations. A similar discrepancy between the hospital admission and discharge distributions with reference to *benign neoplasms* scarcely calls for explanation, since the conditions so specified are very diverse, and the discharge data refer only to a small fraction of hospital cases and at that presumably the more grave. As regards *hernia*, it is beyond dispute that the two sets of figures in Table 136 refer to totally different categories. Those for hospital admissions refer exclusively to operations, mostly of course first operations, whereas those for discharge refer either to individuals who have not submitted to operative treatment, or to recurrent cases.

Concerning psychiatric disorders little need here be said to supplement remarks in §1. For United Kingdom hospital admissions with reference to SCHIZOPHRENIA, the trend is more uniform than for discharges. With respect to MANIC DEPRESSIVE PSYCHOSIS, the number of United Kingdom hospitalized cases exceeds discharges for the whole Army during the period covered. Evidently, therefore, this diagnosis is not of itself considered as sufficient grounds for discharge without regard to the gravity of the disorder, which, like chronic bronchitis, is liable to recur with increasing severity. Presumably this is the explanation of a disparity between the two distributions. Hospital admissions show a peak at about 44 years of age, whereas liability to discharge increases to the limit of the age range. A corresponding but more striking disparity emerges from comparison of the two sets of figures for ANXIETY STATE. These three conditions and PARANOID STATE each have the facies of a clear-cut clinical phenomenon in so far as the age distribution discloses a uniform trend. This is not true of OBSESSIONAL PSYCHO-NEUROSIS, HYSTERIA, NEURASTHENIA and (needless to say) "PSYCHOPATHIC PERSONALITY."

With respect to most diseases, A.T.S. hospital admissions for a single year are relatively few, and since the age composition of the population at risk is very skew the computed incidence of the older age groups is liable to considerable variation. With due regard to these considerations, previous remarks with reference to communicable diseases and appendicitis apply equally to males and females. There is one apparent exception to this statement, namely INFECTIVE HEPATITIS. Among women, the incidence of this disease does not appear to fall off conspicuously with age. This may be due partly to the fact that it is much less common among women than among men, though possibly also to a sex-difference with reference to the power of the body to react to the virus antigen. The male and female distributions of SCABIES each refer to large samples which reveal a striking difference. In view of the fact that a high proportion of patients do not receive hospital treatment, its interpretation clearly calls for caution. Almost certainly the male sample contains a higher proportion of intractable cases, which inflate the incidence in the older segment of the population. The only psychiatric disorders for which the A.T.S. samples are large enough to justify confidence exhibit no features other than those which the discharge data disclose. One feature worthy of comment in Table 135 is a dip in the incidence in the 22-24 age group of virus diseases, scarlet fever and tonsillitis. A similar dip is evident in the figures of Table 134, where it might otherwise provoke the suspicion that our estimate of the relative strength of this age group in the 1943 United Kingdom Army population is somewhat excessive.

The data in Table 134 provides a basis for standardization of figures referable to populations of different age composition. Since age-strength distributions of the

several theatres for successive years of the war are not available, the presentation of standardizing factors for hospital admissions comparable to those shown in Tables 132-133 of §**1**, which dealt with discharges, is not feasible. We can, however, utilize the information at our disposal to provide a check on the significance of sex differences with respect to hospitalized morbidity. Theoretically it comes to the same thing to ask *either* : (*a*) what the female rate would be if, with its own age-incidence distribution, the age-strength distribution were that of the male population in the same year, *or* (*b*) what the male rate would be if, with its own age-incidence distribution, its age-strength distribution were that of the female population in the same year. If we are merely concerned with elucidating the significance of sex differences, the second is preferable. Table 137 shows some standardizing factors computed on this basis. To say that the *military* standardizing factor with reference to A.T.S. strength for *Gastric Ulcer* in the year 1944 is 0·468 means that it is necessary to multiply the male incidence in that year by 0·468 to make it comparable with the female incidence of the same year, with the implication that differences with reference to age composition of the two populations do not then affect conclusions drawn from such a comparison.

In the female population, the total annual number of gastric and duodenal ulcers specified as such is small. In 1943 there were 50 hospital admissions and 61 discharges from the Service. The ratios of duodenal to gastric ulcers based on these figures are very much smaller than the corresponding ratios for males. Though the female sample is small, the difference is worth recording, especially in view of the fact that the effect of age standardization is to reinforce the impression derived from the crude figures. The following table exhibits ratios of duodenal to gastric ulcers based on data from two sources :

	Males	Females
Discharges		
Crude	4·7	2·5
Standardized	5·4	2·5
Hospital Admissions		
Crude	3·9	1·9
Standardized	4·4	1·9

These figures suggest the conclusion that the excessive incidence of peptic ulcers in the male population is largely due to greater liability of the male to the duodenal type which is the more common of the two. Without more data this must remain a suggestion. It would be interesting to know how relative liability to one or other type is related to occupation.

As age differences bear on comparison of rates for bronchitis and peptic ulcers, there is nothing to add to the remarks in §**1**. In the Army these diseases are more common among males and more common in the older age groups which are relatively larger in the male population; so the effect of age standardization is to reduce considerably the sex difference with reference to crude incidence. This applies similarly to APPENDICITIS, SCARLET FEVER and TONSILLITIS. These affect most the younger age groups and are more common in the female population, which is relatively younger than the male. Application of the appropriate standardizing factors, therefore, reduces sex differences with respect to their crude incidence, but does not by any means obliterate them.

The last two tables (138 and 139) of this section present a contrast between discharge and hospitalization (United Kingdom) rates for psychiatric disorders as a whole and for all diseases taken together. The figures for both sexes reveal a striking difference between hospital admission rates and invalidings. Whereas the liability to sickness involving hospitalization does not materially differ in different age groups of the population, the liability to discharge from the service on medical grounds increases steeply with advancing age, and consistently so, except for the first triennium in which we have already found indications of a preliminary weeding process. This contrast is not surprising in the light of previous discussion. The plateau distribution of hospital admissions signifies that the decreasing risk of contracting communicable diseases as age advances counterbalances the increasing risk of contracting other organic complaints and psychiatric disorders. The characteristic feature of the discharge distributions is attributable in greater or less degree to three circumstances :

(*a*) communicable diseases, which collectively make a considerable contribution to hospitalization statistics, are responsible for a trivial proportion of invalidings ;

(*b*) as opposed to the risk of hospitalization from a disease, liability to discharge from the service on medical grounds entails a more exacting criterion of gravity which almost certainly increases with advancing age ;

(*c*) administrative considerations involving the potential service value of younger or older individuals may well weigh with medical boards, when they assess the gravity of a condition.

In view of the much greater relative contribution of psychiatric disorders to invalidings as compared with their contribution to hospitalization, it is instructive to compare the total wastage distributions of Table 139 with corresponding distributions (Table 138) for psychiatric cases as a whole (including as such Mental Deficiency but *not* Epilepsy). Broadly speaking, we may say that the general trend characteristic of the discharge data is dominated by the contribution of psychiatric disorders, and that the presence of a large component referable to communicable diseases in the hospitalization figures suffices to override this trend.

§2 (*contd.*) HOSPITAL ADMISSIONS IN THE U.K.

TABLE 134 Relative Age-Incidence Distributions; Military Other Ranks

	< 22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Size of Sample
A. Communicable Diseases:												
T.B. Pulmonary (excl. Pleurisy)	8·50	7·92	7·42	6·75	6·50	9·67	11·08	12·17	15·92	14·08	100·00	1,353
T.B.—Other Sites	17·63	10·19	8·65	10·84	10·19	9·42	8·11	6·90	10·19	7·89	100·00	435
T.B. All (excl. Pleurisy)	10·27	8·41	7·62	7·62	7·17	9·65	10·45	11·07	14·79	12·93	100·00	1,788
Diphtheria	27·29	18·14	13·78	13·08	9·14	7·45	3·94	2·95	1·41	2·81	100·00	779
C.S.F.	27·96	8·63	4·83	9·44	6·56	13·12	10·01	2·42	17·03	—	100·00	217
Dysentery—Bacillary	27·04	8·27	10·49	11·11	8·52	10·49	7·16	8·77	4·94	3·21	100·00	608
Chickenpox	38·16	11·06	13·48	9·65	6·38	8·94	4·96	4·68	2·70	—	100·00	411
Glandular Fever	32·45	13·59	19·28	9·71	4·72	5·27	4·44	2·36	4·16	4·02	100·00	272
Measles	42·26	9·31	10·74	12·32	9·03	4·01	5·01	2·44	4·87	—	100·00	953
Mumps	34·78	10·05	10·05	12·23	8·42	7·74	6·66	5·71	2·17	2·17	100·00	984
Rubella	50·50	4·76	8·23	10·25	7·22	7·36	5·34	2·89	2·31	1·15	100·00	1,017
Scarlet Fever	34·70	7·92	9·23	10·16	10·03	10·03	6·20	5·41	3·83	2·51	100·00	842
Tonsillitis	17·50	10·62	12·60	12·37	10·50	12·25	8·52	6·30	5·02	4·32	100·00	3,604
*Erysipelas	4·90	2·91	3·44	5·56	7·62	7·81	13·05	15·23	17·09	22·38	100·00	468
Otitis Media—acute	21·01	13·54	9·87	13·29	10·76	10·25	9·11	6·71	2·78	2·66	100·00	731
—chronic	10·60	10·81	12·06	11·02	9·24	9·36	9·77	6·96	12·27	7·90	100·00	1,646
*Sinusitis—acute	18·17	6·80	13·27	12·37	7·36	11·71	7·80	8·36	3·01	11·15	100·00	249
—chronic	13·79	6·73	13·12	10·20	12·67	14·24	11·10	8·41	3·36	6·39	100·00	444
Pneumonia—Lobar	13·80	6·52	5·77	7·19	6·61	8·44	9·70	7·36	10·03	24·58	100·00	1,819
—Broncho	12·80	3·66	4·19	6·78	6·85	7·54	7·54	12·95	20·18	17·52	100·00	823
—Virus	18·78	7·46	8·89	8·49	7·12	8·54	7·43	11·41	6·60	15·27	100·00	992
Infective Hepatitis	16·28	15·07	13·12	12·39	10·09	8·26	7·65	6·08	5·83	5·22	100·00	3,536
†Post-arsphenamine jaundice	6·69	9·66	9·64	9·71	10·70	10·79	11·57	9·90	10·11	11·22	100·00	1,660
Syphilis—Primary, early and secondary	8·32	11·64	10·91	12·68	10·19	9·88	9·24	8·52	10·19	8·42	100·00	2,717
Gonorrhoea—Primary	7·97	15·15	13·02	13·02	11·00	9·43	9·09	7·07	8·98	5·27	100·00	10,675
Scabies	12·62	11·34	9·84	11·98	8·24	9·95	9·20	12·41	10·16	4·28	100·00	592
Impetigo	25·64	13·68	10·01	9·04	7·45	7·69	7·33	7·57	6·35	5·25	100·00	7,733

*Sample includes cases for 1944. † Strength used was the age-distribution of syphilis cases.

TABLE 134 (*contd.*) **Relative Age-Incidence Distributions ; Military Other Ranks**

	< 22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Size of Sample
B. **Disorders supposedly resulting from Infection :**												
Nephritis—acute	10·58	9·04	7·51	9·22	6·31	8·45	4·95	6·23	16·38	21·33	100·00	126
—chronic	4·27	5·12	6·87	5·05	5·31	6·54	12·31	8·42	21·24	24·87	100·00	123
Rheumatic Fever	23·18	12·29	10·50	11·14	13·19	9·73	6·02	9·48	2·30	2·18	100·00	461
C. **Other Organic Disorders :**												
Duodenal Ulcer	2·01	3·87	5·30	8·03	8·82	10·32	13·84	16·85	17·78	13·19	100·00	2,439
Gastric Ulcer	1·27	2·66	3·12	4·51	7·87	10·58	11·10	14·63	19·43	24·81	100·00	624
All Peptic Ulcers	1·91	3·55	4·72	7·25	8·48	10·32	13·19	16·27	18·05	16·27	100·00	3,215
Appendicitis	21·42	13·34	10·53	10·89	10·04	8·20	8·69	7·34	5·26	4·28	100·00	4,874
Chronic Bronchitis	1·95	2·31	2·77	3·90	4·87	7·64	11·59	14·21	23·18	27·59	100·00	3,190
*Thyrotoxicosis	6·65	7·29	10·02	10·18	11·58	14·93	9·76	6·55	19·26	3·76	100·00	199
Asthma	8·54	4·81	6·05	8·96	10·53	8·13	9·70	13·93	18·08	11·28	100·00	925
Neoplasms (Benign and unspecified)	11·63	6·37	7·94	8·59	8·86	10·71	10·06	11·91	11·82	12·10	100·00	2,887
* (Malignant)	1·88	2·72	3·41	4·44	5·67	7·63	10·01	13·16	23·19	27·88	100·00	104
Hernia	12·37	7·63	7·39	8·42	9·46	11·02	12·32	12·15	11·03	8·22	100·00	6,868
D. **Psychiatric and Nervous Disorders :**												
Sciatica	1·72	2·68	4·67	7·55	9·47	11·05	12·83	16·68	18·94	14·41	100·00	1,462
Effort Syndrome	8·46	4·94	6·20	7·12	8·63	11·47	13·07	15·91	14·66	9·55	100·00	553
Neurasthenia	6·69	7·05	2·98	11·84	10·85	14·38	11·84	15·91	9·31	9·13	100·00	78
Epilepsy	17·41	11·13	6·58	7·49	7·09	8·60	9·11	12·85	14·47	5·26	100·00	452
Obsessive Pyschoneurosis	3·96	10·63	12·08	11·67	10·83	14·48	15·10	10·31	10·94	—	100·00	231
Schizophrenia	21·18	15·39	9·85	9·48	9·48	10·34	8·13	8·13	5·42	2·59	100·00	728
Paranoid State	0·44	1·33	1·43	3·95	7·36	6·02	11·65	21·63	17·58	28·59	100·00	68
Psychopathic Personality	13·90	11·07	10·53	11·40	9·55	8·36	9·77	10·64	10·64	4·13	100·00	1,488
Manic Depressive Psychosis	4·25	6·14	6·85	7·95	8·43	9·84	12·13	15·59	15·83	12·99	100·00	1,004
Anxiety State	5·83	7·92	8·93	9·74	10·11	10·75	12·02	13·11	13·93	7·65	100·00	6,458
Hysteria	15·03	10·05	8·68	9·42	10·79	9·52	10·16	9·21	10·79	6·35	100·00	2,908

* Sample includes cases for 1944.

TABLE 135 **Relative Age-Incidence Distributions ; A.T.S. Auxiliaries**

	< 22	22–24	25–27	28–30	31–33	34–36	37–39	> 39	Total	Size of Sample
A. **Communicable Diseases :**										
T.B. Pulmonary (excluding Pleurisy)	12·72	13·79	16·47	14·99	8·84	20·35	7·50	5·35	100·00	161
T.B.—Other Sites	15·69	16·74	13·12	9·65	5·73	9·80	29·26	—	100·00	94
T.B. All (excluding Pleurisy)	13·79	14·76	15·32	13·23	7·80	16·71	14·90	3·48	100·00	255
Diphtheria	26·24	18·28	23·66	20·43	4·09	—	—	7·31	100·00	191
Dysentery—Bacillary	20·87	22·01	7·97	17·08	6·07	10·44	15·56	—	100·00	111
*Chickenpox	29·56	7·61	16·81	15·75	7·79	7·08	—	15·40	100·00	155
*Glandular Fever	26·89	6·39	19·67	12·13	15·74	19·18	—	—	100·00	106
Measles	24·52	6·29	16·13	6·45	15·16	3·23	14·52	13·71	100·00	304
Mumps	25·97	9·02	23·76	17·86	6·26	—	—	17·13	100·00	208
Rubella	33·95	7·25	16·56	6·42	11·18	14·49	—	10·14	100·00	264
Scarlet Fever	28·41	10·36	13·05	16·89	9·98	8·64	12·67	—	100·00	275
Tonsillitis	29·38	10·66	16·70	21·13	9·46	6·84	3·42	2·41	100·00	534
Otitis Media—Acute	17·31	19·26	21·91	21·91	5·48	—	14·14	—	100·00	113
Sinusitis—all	16·98	6·59	9·63	14·32	21·04	14·58	5·45	11·41	100·00	214
Pneumonia—Lobar	8·95	9·62	5·33	12·86	9·71	39·33	8·29	5·90	100·00	104
* —Broncho	19·07	2·06	11·92	8·88	—	28·06	—	30·01	100·00	96
Infective Hepatitis	16·44	14·65	12·71	11·96	12·41	15·25	13·45	3·14	100·00	302
Syphilis—primary, early and secondary	19·69	11·08	12·77	9·38	16·77	—	—	30·31	100·00	98
Gonorrhoea—primary	16·18	13·15	11·27	12·72	21·10	13·58	—	11·99	100·00	390
Scabies	33·41	16·59	11·29	10·14	8·99	10·14	7·60	1·84	100·00	829
Impetigo	33·67	19·39	14·54	10·97	2·81	4·59	14·03	—	100·00	328

* **Sample includes cases for 1944.**

TABLE 135 (*contd.*)

Relative Age-Incidence Distributions ; A.T.S. Auxiliaries

	<22	22–24	25–27	28–30	31–33	34–36	37–39	> 39	Total	Size of Sample
C. **Other Organic Disorders :**										
Appendicitis	22·02	16·33	17·25	13·94	7·89	8·62	10·09	3·85	100·00	1,821
Bronchitis—Chronic	3·65	5·45	7·30	8·41	7·42	19·25	4·75	43·77	100·00	111
Asthma	15·55	5·74	14·95	12·80	14·47	7·18	10·53	18·78	100·00	206
Neoplasms (benign and unspecified)	7·15	3·86	9·40	7·78	11·78	17·67	18·30	24·05	100·00	488
D. **Psychiatric and Nervous Disorders :**										
Schizophrenia	7·61	5·26	13·20	11·42	14·41	19·84	7·37	20·89	100·00	100
Psychopathic Personality	9·48	5·95	12·73	15·15	14·87	25·65	—	16·17	100·00	111
Manic Depressive Psychosis	6·60	7·73	7·41	14·65	16·18	13·93	24·80	8·70	100·00	177
Anxiety State	5·66	7·02	9·96	12·30	14·94	18·26	12·68	19·17	100·00	432
Hysteria	16·00	10·67	9·87	15·07	8·53	20·27	13·73	5·87	100·00	444

TABLE 136

Comparison of Relative Age-Incidence Distributions of Admissions to Hospital in the U.K. and of Discharges from the Army on Medical Grounds; Military Other Ranks

		<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	>45	Total	Size of Sample
A. **Communicable Diseases:**													
T.B. Pulmonary (excl. Pleurisy)	Admissions	8·50	7·92	7·42	6·75	6·50	9·67	11·08	12·17	15·92	14·08	100·00	1,353
	*Discharges	8·81	8·02	7·72	6·80	6·70	8·26	9·56	11·08	16·02	17·03	100·00	4,700
T.B.—Other Sites	Admissions	17·63	10·19	8·65	10·84	10·19	9·42	8·11	6·90	10·19	7·89	100·00	435
	*Discharges	16·18	10·27	10·40	10·09	8·12	8·52	8·72	7·57	9·58	10·55	100·00	968
B. **Disorders supposedly resulting from Infection:**													
Rheumatic Fever	Admissions	23·18	12·29	10·50	11·14	13·19	9·73	6·02	9·48	2·30	2·18	100·00	461
	*Discharges	20·98	9·36	9·25	5·42	9·88	9·39	8·73	9·46	9·17	8·35	100·00	303
C. **Other Organic Disorders:**													
Duodenal Ulcer	Admissions	2·01	3·87	5·30	8·03	8·82	10·32	13·84	16·85	17·78	13·19	100·00	2,439
	Discharges	2·21	3·33	4·59	7·35	8·78	10·96	13·21	16·76	17·49	15·30	100·00	4,665
Gastric Ulcer	Admissions	1·27	2·66	3·12	4·51	7·87	10·58	11·10	14·63	19·43	24·81	100·00	624
	Discharges	1·51	1·98	2·71	4·34	5·90	9·75	12·61	16·71	19·38	25·12	100·00	995
All Peptic Ulcers	Admissions	1·91	3·55	4·72	7·25	8·48	10·32	13·19	16·27	18·05	16·27	100·00	3,215
	Discharges	2·06	3·03	4·15	6·63	8·13	10·62	13·08	16·92	17·98	17·41	100·00	5,843
Chronic Bronchitis	Admissions	1·95	2·31	2·77	3·90	4·87	7·64	11·59	14·21	23·18	27·59	100·00	3,190
	Discharges	0·34	0·49	0·75	1·11	2·07	2·98	5·83	12·01	22·45	51·97	100·00	2,181
Asthma	Admissions	8·54	4·81	6·05	8·96	10·53	8·13	9·70	13·93	18·08	11·28	100·00	925
	Discharges	5·70	3·83	5·35	8·01	8·10	10·22	10·66	14·72	16·95	16·45	100·00	543
Neoplasms (Benign and Unspecified)	Admissions	11·63	6·37	7·94	8·59	8·86	10·71	10·06	11·91	11·82	12·10	100·00	2,887
	Discharges	3·87	3·76	3·47	8·27	3·16	8·25	9·60	14·60	18·69	26·32	100·00	100
(Malignant)	*Admissions	1·88	2·72	3·41	4·44	5·67	7·63	10·01	13·16	23·19	27·88	100·00	104
	Discharges	2·06	1·73	1·99	2·31	4·81	6·75	9·23	14·61	24·20	32·32	100·00	349
Hernia	Admissions	12·37	7·63	7·39	8·42	9·46	11·02	12·32	12·15	11·03	8·22	100·00	6,868
	*Discharges	0·39	0·31	0·47	1·24	1·67	2·91	5·31	10·04	14·56	63·10	100·00	367

* Sample includes cases for 1944.

TABLE 136 (*contd.*)

Comparison of Relative Age-Incidence Distributions of Admissions to Hospital in the U.K. and of Discharges from the Army on Medical Grounds ; Military Other Ranks

		<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Size of Sample
D. **Psychiatric and Nervous Disorders :**													
Sciatica	Admissions	1·72	2·68	4·67	7·55	9·47	11·05	12·83	16·68	18·94	14·41	100·00	1,462
	Discharges	1·41	1·90	2·32	3·42	5·95	7·96	12·44	20·36	18·91	25·31	100·00	413
Epilepsy	Admissions	17·41	11·13	6·58	7·49	7·09	8·60	9·11	12·85	14·47	5·26	100·00	452
	*Discharges	21·50	10·40	8·87	8·38	8·70	8·74	8·99	10·55	9·11	4·76	100·00	2,224
Obsessive Psychoneurosis	Admissions	3·96	10·63	12·08	11·67	10·83	14·48	15·10	10·31	10·94	—	100·00	231
	Discharges	4·41	5·89	8·32	8·14	8·24	7·96	15·32	12·95	21·30	7·47	100·00	237
Schizophrenia	Admissions	21·18	15·39	9·85	9·48	9·48	10·34	8·13	8·13	5·42	2·59	100·00	728
	Discharges	18·66	12·84	9·89	8·63	9·60	8·79	9·28	8·92	5·89	7·49	100·00	1,017
Paranoid State	Admissions	0·44	1·33	1·43	3·95	7·36	6·02	11·65	21·63	17·58	28·59	100·00	68
	*Discharges	0·21	1·16	1·25	4·72	4·19	5·66	11·18	14·23	31·94	25·45	100·00	140
Psychopathic Personality	Admissions	13·90	11·07	10·53	11·40	9·55	8·36	9·77	10·64	10·64	4·13	100·00	1,488
	Discharges	12·13	8·21	7·70	8·23	7·58	8·57	9·58	11·27	15·45	11·28	100·00	2,774
Manic Depressive Psychosis	Admissions	4·25	6·14	6·85	7·95	8·43	9·84	12·13	15·59	15·83	12·99	100·00	1,004
	Discharges	3·24	3·83	4·68	6·33	7·61	9·83	12·27	17·44	16·91	17·86	100·00	992
Anxiety State	Admissions	5·83	7·92	8·93	9·74	10·11	10·75	12·02	13·11	13·93	7·65	100·00	6,458
	Discharges	2·91	3·54	4·57	5·71	7·11	9·09	11·04	16·00	19·33	20·70	100·00	6,325
Hysteria	Admissions	15·03	10·05	8·68	9·42	10·79	9·52	10·16	9·21	10·79	6·35	100·00	2,908
	Discharges	8·68	5·01	5·36	6·36	8·00	9·33	10·76	15·07	19·07	12·36	100·00	3,282

* Sample includes cases for 1944.

TABLE 137

Standardizing Factors with reference to Morbidity of U.K. Military Personnel (using A.T.S. as standard population)

	1943	1944
Scarlet Fever	1·569	1·409
T.B. Pulmonary	0·984	0·957
T.B. Other Sites	1·235	1·178
Infective Hepatitis	1·223	1·243
Impetigo	1·496	1·437
Tonsillitis	1·166	1·130
Pneumonia	1·204	1·097
Bronchitis	0·544	0·509
Otitis Media	1·135	1·128
Gonorrhoea	0·994	1·066
Syphilis	0·957	0·992
Hernia	1·044	0·982
Appendicitis	1·343	1·305
Gastric Ulcer	0·475	0·468
Duodenal Ulcer	0·540	0·540
Peptic Ulcer—*All*	0·531	0·528
Nephritis	0·957	0·937
Asthma	0·880	0·814
All Psychiatric Disorders	0·800	0·772
All Other Diseases	1·032	1·000
All Diseases	1·042	1·012

TABLE 138 Age-Incidence Distributions of all Psychiatric Disorders

(i) **MILITARY O.Rs.**

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total
United Kingdom Hospital Admissions	6·02	5·74	6·40	7·93	8·71	9·88	11·67	14·12	16·76	12·77	100·00
Medical Discharges	6·73	5·05	5·48	6·38	7·40	8·97	10·80	14·85	17·95	16·38	100·00

(ii) **A.T.S. AUXILIARIES**

	<22	22–24	25–27	28–30	31–33	34–36	37–39	> 39	Total
United Kingdom Hospital Admissions	8·74	8·02	11·43	9·06	9·07	12·05	21·42	20·21	100·00
Medical Discharges	5·47	4·89	7·01	10·91	12·93	16·47	19·14	23·19	100·00

TABLE 139 Age-Incidence Distributions of Total Wastage with respect to Disease

(i) **MILITARY O.Rs.**

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total
United Kingdom Hospital Admissions	11·20	8·89	8·42	9·62	9·11	9·65	10·22	10·02	12·42	10·47	100·00
Medical Discharges	4·30	3·42	3·77	4·36	5·43	6·73	8·64	12·81	17·95	32·39	100·00

(ii) **A.T.S. AUXILIARIES**

	<22	22–24	25–27	28–30	31–33	34–36	37–39	> 39	Total
United Kingdom Hospital Admissions	13·39	10·89	12·95	13·18	12·37	14·82	13·25	9·15	100·00
Medical Discharges	5·22	4·96	6·87	9·53	11·10	12·73	18·70	30·90	100·00

§3 COMMUNICABLE DISEASES OF SUB-TROPICAL AND TROPICAL REGIONS

THE last Section emphasized a striking dichotomy w.r.t. risk of specific diseases at different ages. With few exceptions, seemingly consistent with such an explanation, diminishing frequency of communicable diseases as age increases is interpretable on the assumption that immunization by previous attack progressively reduces the *effective*, as opposed to the *apparent*, population at risk. Such a progressive reduction will not occur if previous attacks confer little immunity; and it will not be relevant to the age-risk relation if the disease is: (*a*) extremely rare; (*b*) highly fatal; (*c*) absent in the original habitat of a newly immigrant population.

The first two limitations have been the subject of previous comment. The morbidity experience of an army population serving overseas offers a unique opportunity of testing the general hypothesis stated above by reference to the last named condition (*c*) as an independent check. The data of this Section refer to hospital admissions in M.E.F. during 1943 and 1944. If reliable age-strength distributions were available for the same period, little comment on what follows would be necessary. Unhappily, we are again confronted with a difficulty arising from the fact that need for separate age-strength distributions of different theatres was not recognized until the reorganization of Army Medical Statistics at mid-1944. It is therefore necessary to use estimates which involve judgments liable to err within limits difficult to assess. Our only independent check on such strength estimates is consistency between: (*a*) results of applying them to certain *marker* diseases; (*b*) information gained from other sources w.r.t. the age-risk relations of such. A *marker* disease here signifies one which ordinarily leads to early discharge from the service; and hence a disease w.r.t. which hospitalization and discharge data should tally.

Since we have figures for the age-strength distribution of the army as a whole throughout the war, a relative age-incidence distribution based thereon is not open to any uncertainty arising from defective strength figures. Correspondence between a hospital and a category " E " age-incidence distribution of a marker disease defined as above is therefore a measure of the validity of an estimated age-strength distribution referable to the population from which such a hospital draws its inmates. In the absence of exact information concerning the age-structure of the M.E.F. population during the period to which available disease statistics refer, we can also get some guidance from available sources of information concerning policy of selection for overseas service. Thus we know that the youngest and oldest age groups should be proportionately smaller than in the army population as a whole. After comparing M.E.F. age-incidence distributions derived from age-strength estimates computed on the basis of various plausible assumptions with similar distributions w.r.t. hospitalized cases of the same diseases in the United Kingdom or of discharges under Category " E," it would appear that the known actual age-strength distribution of the C.M.F. in February 1945 is likely to be as good as any other for our purpose. This was used for computing the age-incidence distributions of M.E.F. hospital cases in Table 140.

To assess the propriety of any estimate we employ, we have to give due consideration to the following issues. In view of circumstances relevant to exclusion of the youngest and oldest from service overseas, any estimate of basic strength data is specially liable to error w.r.t. the two age groups at the extremes of the range, viz. *under* 22 and *over* 45. It would therefore be foolish to attach any signal importance to features characteristic of the limiting fringes of the distribution. It is also necessary to take stock of two other circumstances:

(*a*) infantry, being more exposed to conditions where preventive measures are less effective, is the arm of the service with a concentration of the younger age groups;

(*b*) the over 45 age group is likely to have:

- (i) a relatively high concentration in static units where risk of disease is at a minimum;
- (ii) an abnormally high proportion of regular soldiers who have been previously exposed to infections not prevalent in the United Kingdom.
- (iii) a make-up resulting from especially vigorous selection w.r.t. physique or general health.

For all these reasons we should discount: (*a*) *minor* trends to changing susceptibility as age increases; (*b*) conclusions referable to the oldest or youngest age group. With due regard to all these considerations, comparison of the figures in Table 140 indicates a fairly satisfactory correspondence between: (i) age-incidence distributions of M.E.F. hospital cases computed on the basis of the age-strength estimate cited above; (ii) age-incidence distributions w.r.t. corresponding diseases for which statistics are available from other sources. The examples chosen include diseases with respect to which frequency increases consistently and diseases w.r.t. which frequency decreases consistently with advancing age. For each disease chosen, the test distribution refers to a large sample.

Table 141 shows age-incidence distributions so calculated for some diseases which are rare or absent in the United Kingdom; and also includes Cystitis and Pyelitis, likewise based on M.E.F. statistics but omitted by an oversight from the previous analysis of hospitalized diseases in the United Kingdom. To interpret correctly the significance of data embodied in this table, it is essential to bear in mind the uncertainty of figures cited for the initial and final age groups, more especially the latter.

Figures for the oldest age group refer in all cases to a very small sub-sample, and are hence liable to gross sampling error as well as to errors arising from circumstances stated above. With one possible exception it is noteworthy that no disease included in this table displays a conspicuously steep trend, indicative of diminishing frequency as age advances comparable with what is so characteristic of United Kingdom communicable diseases (§2). For Flexner's dysentery, the high incidence in the youngest age group is worthy of comment, because Table 141 indicates a systematic error inherent in the method of computation, and it is such as to produce a *deficiency rather than excess*. We have no means of assessing precisely the incidence of the Flexner type in United Kingdom but clinical experience suggests that it is not uncommon in institutions and its occurrence in the civilian population may well be more extensive than one commonly supposes. In any case, there are good grounds for believing that it is less rare than typhoid. Though these distributions are admittedly imperfect for a variety of reasons stressed above, the conclusion to which we are led is thus consistent with the hypothesis stated in the opening paragraph. It is unfortunate that statistics with reference to Colonial troops do not include data requisite to the elucidation of a supplementary question which British Army experience prompts us to ask, *i.e.* whether a population exposed to risk in early youth would present a totally different picture.

TABLE 140

Comparative Age-Incidence Distributions w.r.t. Certain Diseases; British Army Other Ranks

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	>45	Total	Sample Size
Duodenal Ulcer:												
(*a*) M.E.F. *estimated* hospital cases	1·45	1·74	3·29	4·09	4·89	7·13	9·48	12·52	18·93	36·47	100·00	453
(*b*) U.K. hospital cases	2·01	3·87	5·30	8·03	8·82	10·32	13·84	16·85	17·78	13·19	100·00	2,439
(*c*) Category E discharges	2·21	3·33	4·59	7·35	8·78	10·96	13·21	16·76	17·49	15·30	100·00	4,665
Gastric Ulcer:												
(*a*) M.E.F. *estimated* hospital cases	1·32	1·93	2·70	2·56	4·25	7·70	9·22	13·17	3·16	53·98	100·00	121
(*b*) U.K. hospital cases	1·27	2·66	3·12	4·51	7·87	10·58	11·10	14·63	19·43	24·81	100·00	624
(*c*) Category E discharges	1·51	1·98	2·71	4·34	5·90	9·75	12·61	16·71	19·38	25·12	100·00	995
Infective Hepatitis:												
(*a*) M.E.F. *estimated* hospital cases	14·63	18·59	13·99	10·71	8·06	6·97	5·52	5·12	5·08	11·34	100·00	6,256
(*b*) U.K. hospital cases	16·28	15·07	13·12	12·39	10·09	8·26	7·65	6·08	5·83	5·22	100·00	3,536
Appendicitis:												
(*a*) M.E.F. *estimated* hospital cases	15·06	14·83	11·57	9·58	8·28	6·62	7·20	5·25	8·03	13·58	100·00	1,847
(*b*) U.K. hospital cases	21·42	13·34	10·53	10·89	10·04	8·20	8·69	7·34	5·26	4·28	100·00	4,874

TABLE 141

Relative Age-Incidence Distributions of Admissions to Hospital in Middle East ; British Army Other Ranks, 1943-1944

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Sample Size
Malaria—B.T.	9·52	13·36	11·46	11·07	9·42	8·61	7·68	8·89	5·96	14·03	100·00	13,443
Malaria—M.T.	8·61	14·68	11·27	9·26	8·88	8·49	8·42	9·03	6·33	15·02	100·00	1,392
Dysentery (Flexner)	16·78	11·31	8·96	9·83	8·70	8·17	8·16	8·91	11·98	7·21	100·00	549
Dysentery and Diarrhoea (Protozoal)	5·83	9·91	10·60	9·88	10·30	8·52	8·47	11·03	10·13	15·34	100·00	1,501
Typhoid	12·79	14·29	12·28	12·63	10·64	8·41	13·42	6·39	9·16	—	100·00	244
Sandfly fever	11·47	15·98	12·25	11·37	10·29	8·03	8·53	8·53	6·60	6·95	100·00	8,527
Leishmaniasis-Cutaneous	11·59	18·78	13·61	14·38	11·71	9·95	9·79	10·19	—	—	100·00	256
Infective Hepatitis	14·63	18·59	13·99	10·71	8·06	6·97	5·52	5·12	5·08	11·34	100·00	6,256
Keratitis	8·01	10·26	9·09	10·40	9·50	9·26	9·77	9·99	8·35	15·38	100·00	752
Conjunctivitis	8·62	10·44	8·79	7·58	8·24	9·05	8·82	10·22	8·99	19·25	100·00	1,107
Cystitis and Pyelitis	5·59	10·45	9·39	10·21	9·68	7·67	12·32	13·94	7·65	13·11	100·00	586
Appendicitis	15·06	14·83	11·57	9·58	8·28	6·62	7·20	5·25	8·03	13·58	100·00	1,847
Gastric Ulcer	1·32	1·93	2·70	2·56	4·25	7·70	9·22	13·17	3·16	53·98	100·00	121
Duodenal Ulcer	1·45	1·74	3·29	4·09	4·89	7·13	9·48	12·52	18·93	36·47	100·00	453

§4 DURATION OF HOSPITALIZATION IN THE M.E.F.

IN §1-§3 it has been possible to present an analysis of the age distribution of: (*a*) discharges on medical grounds by diagnostic category against a background of firm figures w.r.t. age structure of the Army as a whole; (*b*) diseases hospitalized in the United Kingdom and in the M.E.F. by recourse to *estimates* of the age structure of the Army population therein. Certain discrepancies between the two classes of distributions are striking, and raise the issue: how far the age trend of invalidings is respectively determined by: (*a*) administrative considerations relative to the decisions of medical boards; (*b*) the relation of age to the *gravity* of a disease as opposed to its occurrence. Hollerith tabulations provide us with a breakdown of diseases hospitalized in the M.E.F. 1943-44, both by age and by duration of stay. In so far as duration of hospitalization is a legitimate yardstick of the gravity of a disease, we have therefore at our disposal the means of discriminating between the two possibilities stated above. An important reservation due in this context is that our sample fails to give a true estimate of total duration w.r.t. cases evacuated to the United Kingdom or sent to a Convalescent Depot, and such cases would in fact be more serious than those returned directly to their units (R.T.U.).

The results exhibited in Tables 142-143 refer only to diseases of which samples sufficiently large to yield statistically clear-cut evidence are available; and they are sufficiently clear-cut to admit of little dubiety. The relative rates for successive age groups shown on a percentage scale in Table 143 in no case depart widely from the 10% level. That is to say age of the patient does not conspicuously influence the duration of stay in hospital. It is admissible that duration of stay is a crude yardstick of the gravity of a disease, but there is no doubt about the conclusion to which its use leads us, if we have to rely on it.

As regards the absolute values of figures in Table 142, it is necessary to state that they refer to *military hospitals* only. Thus they do not include stay in a Convalescent Depot or a B.R.C.S. hospital, and are therefore not comparable with those elsewhere tabulated for assessment of man-day wastage in the United Kingdom (Part II). In this context the end in view is not to assess days lost to service but to clarify the relation of age to the gravity of a disease. Since all the figures in Table 143 are so near the 10% level, it is scarcely necessary to cite standard errors for each.

TABLE 142

Average Duration of Stay in Hospital (days) by Age; British Army Other Ranks, Middle East, 1944

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	All Ages	Sample Size
Appendicitis	26·5	27·4	29·1	28·9	26·2	29·7	28·2	33·9	27·6	33·0	28·2	680
Bronchitis	15·6	16·5	16·4	16·9	16·4	16·0	18·1	17·1	22·2	21·9	16·9	1,812
Burns	30·3	28·3	33·2	25·9	28·7	33·6	31·4	35·4	39·7	18·6	30·3	545
Common Cold	9·9	9·5	9·3	10·1	9·8	9·1	10·6	8·9	12·1	10·3	9·7	1,807
Conjunctivitis	24·8	25·4	19·0	23·8	22·2	27·4	28·9	19·2	18·5	16·0	23·6	404
*Cystitis and Pyelitis	30·7	25·2	22·1	25·4	26·4	24·4	23·9	35·8	54·8	33·0	25·6	586
Diphtheria (Faucial, Laryngeal and Nasal)	50·5	49·8	45·7	51·2	49·0	43·7	51·3	44·6	—	—	49·0	254
*Dysentery—Flexner	14·5	14·2	15·1	13·8	15·0	15·9	16·4	15·0	27·1	26·0	14·9	549
Dysentery—Amoebic	34·3	37·0	41·1	43·0	37·5	38·2	36·8	36·4	46·0	26·0	39·4	498
Dysentery and Diarrhoea (unspecified)	13·9	13·8	14·3	14·0	14·7	14·4	14·6	13·5	16·9	14·9	14·3	4,362
Dyspepsia and Gastritis	12·0	15·1	16·6	17·4	17·0	18·1	21·3	18·1	25·1	24·4	17·6	972
*Foot Deformities	28·6	25·8	25·1	26·6	30·7	30·5	24·7	19·7	21·0	17·5	26·7	554
Gonorrhoea	31·7	25·5	20·8	22·0	22·2	24·1	24·3	18·9	10·9	—	23·3	914
Haemorrhoids	18·2	23·8	19·4	23·5	21·5	25·7	24·6	26·7	22·9	24·2	23·1	823
Hernia	42·5	38·4	36·0	37·1	40·4	39·7	38·4	36·7	31·9	31·6	38·3	721
*I.D.K.	40·2	33·2	30·9	30·9	39·2	26·8	30·3	25·3	32·0	19·0	32·6	580
Impetigo	24·2	22·5	23·8	21·6	22·3	22·7	20·5	18·5	16·5	12·2	22·5	1,014
Infective Hepatitis	27·3	27·9	29·0	30·8	32·3	33·0	40·1	40·1	30·1	40·4	30·3	1,948
Influenza	18·6	11·8	11·6	11·9	11·6	12·9	11·0	10·6	12·5	—	12·2	253
Injuries N.E.A. (*excl.* burns)	30·5	35·4	34·3	32·7	35·9	34·5	37·8	36·1	38·3	41·2	34·7	2,790
Keratitis	40·1	31·4	35·9	27·5	29·8	31·3	25·9	32·3	24·6	17·0	31·2	273
*Leishmaniasis—cutaneous	28·9	34·4	25·9	26·7	22·9	30·2	15·8	28·9	—	—	28·1	256
Malaria—B.T.	16·4	16·2	16·6	15·9	16·5	16·2	17·3	18·8	20·0	20·1	16·5	7,545
Malaria—M.T.	16·5	17·3	15·5	17·7	26·8	17·6	22·2	19·1	23·5	11·0	18·5	416

*1943 and 1944

TABLE 142 (*contd.*)

Average Duration of Stay in Hospital (days) by Age; British Army Other Ranks, Middle East, 1944

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	All Ages	Sample Size
*Mumps	18·2	18·5	18·7	19·4	22·0	19·3	21·4	—	—	27·0	19·5	119
*Neoplasms—malignant	19·8	31·2	37·6	50·5	33·3	58·6	37·5	50·5	47·0	65·5	42·2	123
*Nephritis	34·6	60·2	58·9	38·9	48·9	49·6	33·8	53·0	27·0	19·5	48·7	164
Otitis externa	18·8	13·6	16·0	15·9	16·5	15·8	14·6	16·9	13·0	13·5	15·7	567
Otitis media	23·4	25·2	25·4	25·9	22·9	26·9	25·9	37·5	35·0	14·0	25·5	902
*Gastric Ulcer	51·6	55·7	52·5	49·4	61·4	51·3	55·1	41·1	12·0	57·8	52·6	121
Duodenal Ulcer	67·8	63·6	63·5	62·0	65·9	50·5	53·9	62·3	50·4	56·2	59·1	232
Pneumonia—Lobar	32·7	28·6	32·5	31·0	30·9	38·0	29·2	45·3	39·3	2·0	32·0	486
*Pneumonia—Secondary	24·2	28·6	26·9	24·2	27·3	25·9	27·5	27·6	47·7	28·0	26·7	414
Psychosis	75·7	68·0	67·9	72·1	65·2	79·6	88·6	42·8	64·1	44·5	70·9	244
Psychoneurosis	26·0	33·5	35·4	34·1	34·4	38·1	34·5	42·7	34·9	28·0	34·9	1,469
Psychopathic Personality	57·5	53·3	46·7	52·9	57·5	68·9	38·4	41·4	27·0	32·5	52·7	184
*Rheumatism—articular	58·2	38·2	34·4	30·5	36·3	30·2	27·8	35·0	43·1	36·8	33·6	380
Rheumatism—non-articular	20·2	16·5	17·1	22·0	19·8	20·9	22·0	21·9	23·9	26·4	20·3	869
Sandfly Fever	9·0	8·2	8·2	8·6	8·5	8·6	8·2	8·5	8·7	6·4	8·4	1,731
Scabies	10·8	10·0	12·1	11·3	11·8	10·4	10·8	17·0	5·6	9·0	11·2	569
Sinusitis	20·7	22·2	19·5	19·1	17·1	18·7	24·2	20·8	18·2	14·0	20·0	451
*Synovitis and Arthritis	38·7	28·5	28·3	32·8	33·7	39·6	31·4	28·2	34·0	17·5	31·9	674
Syphilis—early	20·6	23·4	21·7	22·3	23·9	23·3	25·9	28·7	28·8	31·9	23·3	478
Tonsillitis and Pharyngitis	12·8	11·5	11·5	11·8	11·7	12·0	11·4	13·2	16·7	13·7	11·9	5,605
*Typhoid	77·9	69·9	68·8	64·3	70·2	56·0	77·3	67·3	88·5	—	69·0	244
Varicose Veins	19·6	23·0	21·8	22·0	23·1	25·3	25·4	25·3	25·1	42·5	23·2	646

*1943 and 1944

TABLE 143

Relative Duration of Stay in Hospital by Age; British Army Other Ranks, Middle East, 1944

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Sample Size
Appendicitis	9·1	9·4	10·0	9·9	9·0	10·2	9·7	11·7	9·5	11·4	100·0	680
Bronchitis	8·8	9·3	9·3	9·5	9·3	9·0	10·2	9·7	12·5	12·4	100·0	1,812
Burns	9·9	9·3	10·9	8·5	9·4	11·0	10·3	11·6	13·0	6·1	100·0	545
Common Cold	9·9	9·5	9·3	10·1	9·8	9·1	10·6	8·9	12·1	10·3	100·0	1,807
Conjunctivitis	11·0	11·3	8·4	10·6	9·9	12·2	12·8	8·5	8·2	7·1	100·0	404
*Cystitis and Pyelitis	10·2	8·4	7·3	8·4	8·8	8·1	7·9	11·9	18·2	10·9	100·0	586
Diphtheria (Faucial, Laryngeal and Nasal)	13·1	12·9	11·8	13·3	12·7	11·3	13·3	11·6	—	—	100·0	254
*Dysentery—Flexner	8·4	8·2	8·7	8·0	8·7	9·2	9·5	8·7	15·7	15·0	100·0	549
Dysentery—Amoebic	9·1	9·8	10·9	11·4	10·0	10·2	9·8	9·7	12·2	6·9	100·0	498
Dysentery and Diarrhoea (unspecified)	9·6	9·5	9·9	9·7	10·1	9·9	10·1	9·3	11·7	10·3	100·0	4,362
Dyspepsia and Gastritis	6·5	8·2	9·0	9·4	9·2	9·8	11·5	9·8	13·6	13·2	100·0	972
*Foot Deformities	11·4	10·3	10·0	10·6	12·3	12·2	9·9	7·9	8·4	7·0	100·0	554
Gonorrhoea	15·8	12·7	10·4	11·0	11·1	12·0	12·1	9·4	5·4	—	100·0	914
Haemorrhoids	7·9	10·3	8·4	10·2	9·3	11·1	10·7	11·6	9·9	10·5	100·0	823
Hernia	11·4	10·3	9·7	10·0	10·8	10·7	10·3	9·8	8·6	9·5	100·0	721
*I.D.K.	13·1	10·8	10·0	10·0	12·7	8·7	9·8	8·2	10·4	6·2	100·0	580
Impetigo	11·8	11·0	11·6	10·5	10·9	11·1	10·0	9·0	8·1	6·0	100·0	1,014
Infective Hepatitis	8·2	8·4	8·8	9·3	9·8	10·0	12·1	12·1	9·1	12·2	100·0	1,948
Influenza	16·5	10·5	10·3	10·6	10·3	11·5	9·8	9·4	11·1	—	100·0	253
Injuries N.E.A. (*excl.* burns)	8·6	9·9	9·6	9·2	10·1	9·7	10·6	10·1	10·7	11·6	100·0	2,790
Keratitis	13·6	10·6	12·1	9·3	10·1	10·6	8·8	10·9	8·3	5·7	100·0	273
*Leishmaniasis—cutaneous	13·5	16·1	12·1	12·5	10·7	14·1	7·4	13·5	—	—	100·0	256
Malaria—B.T.	9·4	9·3	9·5	9·1	9·5	9·3	9·9	10·8	11·5	11·6	100·0	7,545
Malaria—M.T.	8·8	9·2	8·3	9·5	14·3	9·4	11·9	10·2	12·6	5·9	100·0	416

*1943 and 1944

TABLE 143 (*contd.*)

Relative Duration of Stay in Hospital by Age; British Army Other Ranks, Middle East, 1944

	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	43–45	> 45	Total	Sample Size
*Mumps	11·1	11·2	11·4	11·8	13·4	11·7	13·0	—	—	16·4	100·0	119
*Neoplasms—malignant	4·6	7·2	8·7	11·7	7·7	13·6	8·7	11·7	10·9	15·2	100·0	123
*Nephritis	8·2	14·2	13·9	9·2	11·5	11·7	8·0	12·5	6·4	4·6	100·0	164
Otitis externa	12·2	8·8	10·3	10·3	10·7	10·2	9·4	10·9	8·4	8·7	100·0	567
Otitis media	8·9	9·6	9·7	9·9	8·7	10·3	9·9	14·3	13·4	5·3	100·0	902
*Gastric Ulcer	10·6	11·4	10·8	10·1	12·6	10·5	11·3	8·4	2·5	11·8	100·0	121
Duodenal Ulcer	11·4	10·7	10·7	10·4	11·1	8·5	9·0	10·5	8·5	9·4	100·0	232
Pneumonia—Lobar	10·6	9·2	10·5	10·0	10·0	12·3	9·4	14·6	12·7	0·6	100·0	486
*Pneumonia—Secondary	8·4	9·9	9·3	8·4	9·5	9·0	9·6	9·6	16·6	9·7	100·0	414
Psychosis	11·3	10·2	10·2	10·8	9·8	11·9	13·3	6·4	9·6	6·7	100·0	244
Psychoneurosis	7·6	9·8	10·4	10·0	10·1	11·2	10·1	12·5	10·2	8·2	100·0	1,469
Psychopathic Personality	12·1	11·2	9·8	11·1	12·1	14·5	8·1	8·7	5·7	6·8	100·0	184
*Rheumatism—articular	15·7	10·3	9·3	8·2	9·8	8·2	7·5	9·4	11·6	9·9	100·0	380
Rheumatism—non-articular	9·6	7·8	8·1	10·4	9·4	9·9	10·4	10·4	11·3	12·5	100·0	869
Sandfly Fever	10·9	9·9	9·9	10·4	10·3	10·4	9·9	10·3	10·5	7·7	100·0	1,731
Scabies	9·9	9·2	11·1	10·4	10·8	9·6	9·9	15·6	5·1	8·3	100·0	569
Sinusitis	10·6	11·4	10·0	9·8	8·8	9·6	12·4	10·7	9·4	7·2	100·0	451
*Synovitis and Arthritis	12·4	9·1	9·1	10·5	10·8	12·7	10·0	9·0	10·9	5·6	100·0	674
Syphilis—early	8·2	9·3	8·7	8·9	9·5	9·3	10·3	11·5	11·5	12·7	100·0	478
Tonsillitis and Pharyngitis	10·1	9·1	9·1	9·3	9·3	9·5	9·0	10·5	13·2	10·8	100·0	5,605
*Typhoid	12·2	10·9	10·7	10·0	11·0	8·7	12·1	10·5	13·8	—	100·0	244
Varicose Veins	7·7	9·1	8·6	8·7	9·1	10·0	10·0	10·0	9·9	16·8	100·0	646

*1943 and 1944

Part VII. MEDICAL MAN-POWER AND ACCOMMODATION IN MEDICAL UNITS

§1 ALLOCATION OF MEDICAL MAN-POWER—1945

Inter alia the administration may be called on to provide answers to two classes of questions with respect to medical personnel: (*a*) what basis past experience offers for assessing medical man-power requirements in a given situation; (*b*) whether the allocation of medical man-power to the service is excessive *vis-a-vis* the needs of the civil population. It goes without saying that ratios of British Army medical officers to British Army strengths furnish no basis for a satisfactory answer to one or the other. Valid comparison of medical man-power utilization by an army population such as the British Army during the war 1939-45 with allocation of medical man-power in a civilian population, and evaluation of medical man-power requirements from experience of a force in a particular theatre alike raise an issue analogous to that of budgeting for bedstates in situations where:

(i) British Army medical units provide accommodation for personnel (other Services, Dominions, Allies and Colonial) other than that of the British Army;

(ii) British Army personnel receive treatment in medical units other than those of the British Army, including E.M.S. hospitals.

The need for design of documents to take account of both these circumstances received recognition at a comparatively late stage in the war; and any change of documentation involves an inescapable time-lag. Therefore basic data for a continuous survey of medical man-power utilization throughout the war are not in fact available; but an examination of the situation at mid-year 1945 in the light of information supplied by cable *ad hoc* will be serviceable if it bring into focus what information is essential to a proper balance sheet incorporating all the relevant items on the credit and on the debit side of the account, i.e. data with respect to use of British Army M.Os. for treatment of personnel other than British Army, and data with respect to treatment of British Army personnel by medical men not in the service of the British Army. For it is all too easy to forget that appropriate design of a statistical document calls both for intelligent anticipation of questions which may require an answer and for preliminary analysis to clarify what data are essential to their solution. Lack of such preliminary analysis results in the issue of forms which waste the time of those responsible for filling them by specifying redundant items and that of the administration by omitting others which are essential. For any budget of this sort it is necessary to start with a clearly defined statement of the question or questions for which the documents may be called on to furnish an answer. With due regard to qualifications specified below the first question (*a*) formulated above is reducible to the following terms:

On the basis of experience in a given theatre, how many M.Os. would be requisite to deal with the health of a given quota of troops under British Army administration, if such M.Os. were responsible only for British Army personnel and the latter received medical care exclusively from such M.Os.?

We may call the index so defined the *medical man-power ratio*, here denoted by the symbol R_{MM}. In contradistinction to the crude ratio of British Army M.Os. to British Army troops, the index R_{MM} constitutes a fair assessment of medical man-power *vis-a-vis* the appropriate population at risk. With due regard to responsibilities undertaken by Army M.Os. over and above those of the civilian practitioner (*inspections, medical categorization, mass immunization, &c*), it provides a basis for comparison with medical man-power allocation in a civil population of comparable age composition. A first prerequisite to an evaluation of this sort is to draw a distinction between particular situations embraced by a more general case (Case 3) *viz*:

Case 1. A mixed force of U.K. and Dominion or allied troops with common provision for hospitalization but respectively autonomous with regard to health measures at regimental level, i.e. all R.M.Os. responsible for U.K. troops are British Army medical officers and British Army R.M.Os. are responsible only for U.K. troops;

Case 2. A mixed force of U.K. and indigenous Colonial troops for the care of which British Army medical officers are responsible, i.e. British Army R.M.Os. and administrative officers serve Colonial units as well as hospitals, C.C.S., F.A., etc., accommodating Colonial sick. To make the medical man-power allocation comparable to that of a British Army population at risk, we then have to give consideration to the possibility that the Colonial sick rate is different from that of U.K. troops and to make an appropriate adjustment for total numbers of sick with which M.Os. would have to deal if the entire population at risk were personnel of U.K. domicile.

It will be easier to appreciate what data are essential for the evaluation of the more general case of a theatre in which U.K., Colonial and Allied or Dominion forces share medical man-power in accordance with the conditions implicit in the above, after a preliminary analysis of each of the foregoing. For any such estimates it is necessary to make certain assumptions; and the reliability of the estimates themselves will be greater or less according as such assumptions tally more or less closely with contemporary circumstances. We have first to assume that available figures represent a normal administrative set-up, more especially insofar as the hospital population is representative *vis-a-vis* prevailing local conditions. For simplicity, it will also be convenient to assume that the allocation to Colonial troops of British Army medical officers other than those responsible for domiciliary sick is not primarily affected by different morbidity rates of U.K. and Colonial personnel. For simplicity also we may conveniently neglect what proportion of M.Os. may be held on various X lists, not actively employed. Within the framework of these assumptions, we can now specify for each of the two elementary cases defined earlier, and for the more general one embracing both, an appropriate schema making explicit the requisite data for the design of a statistical document capable of providing an answer to the question stated in italics above. Though reliable figures were not to hand for all theatres, it was possible at least to illustrate the use of such information as was available. Since provision of M.Os. must be adequate to deal with peak *in contradistinction to mean* requirements, an exhaustive factual treatment of the problem should take stock of seasonal fluctuations with respect to sickness (and casualties in general). It is therefore important to emphasize that our data, such as they are, refer only to the specified period of the calendar year. It is also necessary to point out that the estimated numerical value of R_{MM} for a particular theatre depends on the current *evacuation* policy.

Case 1. For a force consisting of U.K. troops and others (Dominion or Allied) autonomous w.r.t. medical care and administration outside medical units while sharing hospitals, C.C.S., F.A., etc., our schema is:

Total Strength British Force	British Army Personnel				Other Personnel
	M.Os. in hospitals C.C.S., F.A., etc.	R.M.Os. (and Admin.)	Sick in Brit. Army Medical units	Sick in *other* Medical units	Sick in Brit. Army Medical units
p_b	d_h	d_b	s_b	s_{bo}	s_{ob}

In this framework d_h British Army doctors look after $(s_b + s_{ob})$ sick, i.e. the medical manpower allocation per patient is $d_h \div (s_b + s_{ob})$. The actual number of British sick is $(s_b + s_{bo})$. If British doctors were responsible only for British sick and all British sick received treatment from British officers only, the total requirements for care of sick would therefore be $(s_b + s_{bo}) d_h \div (s_b + s_{ob})$; and the total medical man-power allocation would be:

$$d_t = d_b + [(s_b + s_{bo})\, d_h \div (s_b + s_{ob})]$$

$$\therefore\ R_{MM} = \frac{d_b}{p_b} + \frac{(s_b + s_{bo})\, d_h}{(s_b + s_{ob})\, p_b}$$

Case 2. For a force consisting of U.K. and indigenous Colonial troops with U.K. R.M.Os. (and administration officers), our schema is as follows:

Total Strengths		U.K. Medical Officers		Sick in British Army Medical Units	
U.K.	Colonial	In hospitals, C.C.S., etc.	R.M.Os. and Admin.	U.K.	Colonial
p_b	p_c	d_h	d_{bc}	s_b	s_c

Our population at risk is now $(p_b + p_c)$. We may assume that the allocation of R.M.Os. and administration is not primarily determined by relative morbidity, and we have merely to make an adjustment of the medical officers directly responsible for domiciliary sickness appropriate to current morbidity, measured in this context by the ratio (M_b *or* M_c) of *numbers remaining in* hospital to total population at risk, i.e.:

$$M_b = s_b \div p_b \textit{ and } M_c = s_c \div p_c$$

If a numerically equivalent population at risk were U.K. troops, $M_b.s_c \div M_c$ British sick would replace s_c Colonial sick; and our total sick would be:

$$s_b + [M_b.s_c \div M_c] = M_b(p_b + p_c)$$

Hence the requisite number of doctors for care of sick would be: $d_h.M_b(p_b + p_c) \div (s_b + s_c)$ and the total number of doctors would be:

$$d_{bc} + [d_h.M_b\,(p_b + p_c) \div (s_b + s_c)]$$

$$\therefore\ R_{MM} = \frac{d_{bc}}{(p_b + p_c)} + \frac{M_b.d_h}{(s_b + s_c)}$$

Case 3. For a force containing both Colonial troops with U.K. R.M.Os. and others (Dominion or Allied) with their own R.M.Os. our schema in conformity with symbols for the preceding more special cases which this one embraces, is as follows:

Brit. Army Medical Officers		Sick in Brit. Hospitals (etc.)				Sick in *OTHER* Hospitals (etc.)		Strengths			Morbidity Ratios *	
R.M.O.s and Admin.	Hospitals, C.C.S., etc.	U.K.	Colonial	Others	Total	U.K.	Colonial	U.K.	Colonial	Total	U.K.	Colonial
d_{bc}	d_h	s_b	s_c	s_{ob}	t_b	s_{bo}	s_{co}	p_b	p_c	t_p	$(s_b+s_{bo})\div p_b = M_b$	$(s_c+s_{co})\div p_c = M_c$

*Defined as above, i.e. ratio of numbers remaining in hospital to total population at risk

As for Case 2 above we may now set against a population at risk taken to be $p_b + p_c = t_p$ medical man-power requirements under these headings:

(i) R.M.Os., etc. $= d_{bc}$;

(ii) M.Os. responsible for U.K. and Colonial sick.

British Army M.Os. responsible for t_b domiciliary sick are d_h, an allocation per patient of $d_h \div t_b$. The equivalent number of British and Colonial sick with due regard to differential morbidity is:

$$(s_b + s_{bo}) + [M_b (s_c + s_{co}) \div M_c] = M_b.t_p.$$

Hence for (ii) above we have $d_h.M_b.t_p \div t_b$.

$$\therefore R_{MM} = \frac{d_{bc}}{t_p} + \frac{M_b.d_h}{t_b}$$

Each of the three foregoing formulae is the sum of 2 comparable terms (A + B):

	A.		B.
1.	$\frac{d_b}{p_b}$		$\frac{(s_b + s_{bo})\, d_h}{(s_b + s_{ob})\, p_b}$
2.	$\frac{d_{bc}}{p_b + p_c}$	$\frac{M_b.d_h}{(s_b + s_c)}$ =	$\frac{s_b.d_h}{p_b\,(s_b + s_c)}$
3.	$\frac{d_{bc}}{p_b + p_c}$	$\frac{M_b.d_h}{t_b}$ =	$\frac{(s_b + s_{bo})\, d_h}{p_b\,(s_b + s_c + s_{ob})}$

In conformity with assumptions stated elsewhere, the first term (A) exhibits the number of M.Os. requisite for Administrative and R.M.O. treatment of a given quota of troops. The second (B) shows the number requisite for domiciliary treatment of sick troops, if M.Os. employed in British hospitals were responsible only for British Army personnel and British troops received domiciliary treatment only in British Army medical units.

Medical man-power in U.K.

On the basis of figures for sick made available by the redesign of A.F.W.3180 to take account of the circumstances cited at the conclusion of the opening paragraph above, it is possible to make a precise estimate of medical man-power allocation at mid-1945. From information supplied by the appropriate medical branch (A.M.D.1) figures for different categories of medical personnel were as follows:

Admin. and R.M.Os.

R.M.Os. i.c. troops, excluding 45 Div. and A.A. Comd.	550
Home Field Army	309
45 Div. and A.A. Comd.	238
Held and under training	510
Staffs	169
Home Psychiatric Pool	92
Others, excluding seaborne establishments based in U.K.	242
Total (d_b)	2,110

Medical Units

Military Hospitals	593
Reception Stations (Military)	268
Reception Stations (A.T.S.)	65
Convalescent Depots	43
Total (d_h)	969

The total population at risk as supplied by A.G. (Stats.) was 1,331,263. The relevant figures for sick were:

British Army Sick in Medical units under British Army Administration....	(s_b)	24,896
Other sick in medical units under British Army Administration	(s_{ob})	2,544
British Army Sick in *other* (E.M.S.) units	(s_{bo})	38,887

We have no appreciable number of Colonial troops with which to reckon and may therefore regard Case 1 above as the appropriate model. Since $(s_b + s_{bo}) = 63{,}783$ and $(s_b + s_{ob}) = 27{,}440$,

$$R_{MM} = \frac{2{,}110}{1{,}331{,}263} + \frac{(63{,}783)\ (969)}{(27{,}440)\ (1{,}331{,}263)}$$
$$= 0 \cdot 003277$$
$$= 3 \cdot 28 \text{ per } 1{,}000 \textit{ or } 1 \text{ M.O. per } 305 \text{ troops.}$$

If we took no account of the contribution of the E.M.S. to the British Army or of that of British Army M.Os. to other personnel the (crude) ratio would be:

$$\frac{d_b + d_h}{p_b} = \frac{3{,}079}{1{,}331{,}263} = 0 \cdot 0023128$$
$$= 2 \cdot 31 \text{ per } 1{,}000 \textit{ or } 1 \text{ M.O. per } 432 \text{ troops.}$$

West Africa

The relevant figures as at 31st July, 1945 were:

British Army strength	6,306	$= p_b$
Colonial Army strength....	52,601	$= p_c$
British Army M.Os. in medical units	113	$= d_h$
British Army M.Os.-others	47	$= d_{bc}$
British Army sick in British Army Medical Units	164	$= s_b$
Colonial (and other) sick in British Army Medical Units	1,748	$= s_c$

The last item is not a firm figure for s_c in the sense defined in the foregoing treatment of Case 2 since it may include a *small* (but certainly not very significant) proportion of sick other than Colonial troops (*e.g.* R.N. and R.A.F. personnel). We may disregard 13 cases of British Army personnel in *other* units. With due regard to these trivial qualifications, we can use the formula cited for Case 2:

$$M_b = s_b \div p_b = 164 \div 6306 = 0 \cdot 026007$$
$$\therefore R_{MM} = \frac{47}{58{,}907} + \frac{(0 \cdot 026007)\,(113)}{1{,}912}$$
$$= 0 \cdot 002335$$
$$= 2 \cdot 34 \text{ per } 1000 \textit{ or } 1 \text{ M.O. per } 428 \text{ troops.}$$

The crude ratio of British Army doctors to U.K. troops is $160 \div 6306 = 0 \cdot 02537$, i.e. $25 \cdot 37$ per 1,000 *or* 1 M.O. per 39 troops. The ratio of British Army doctors to all troops (U.K. and Colonial) calculated without regard to the morbidity differential would be $160 \div 58{,}907 = 0 \cdot 00272$, i.e. $2 \cdot 72$ per 1,000 *or* 1 M.O. per 368 troops.

A.L.F.S.E.A.

Since the new statistical proforma for Monthly Hygiene Reports had not come into use at mid-year 1945, available information obtained by cable concerning the Far Eastern theatre was less satisfactory than such as we had at our disposal with respect to U.K. or W. Africa. From such data as were to hand, it appears legitimate to regard A.L.F.S.E.A. as a case on all fours with the preceding if we consider British and Indian Army as a single entity in this context. As will be seen from the following figures for strengths we may disregard without serious error reciprocity between (*a*) British or Indian Army and (*b*) *other* administration.

British troops (British Army)	164,728	
British troops (Indian Army)....	4,993	
Total British troops (p_b)		169,721
Indian Army troops	679,183	
Burma Army troops	7,234	
Other Colonial troops	151,535	
Total Colonial (p_c)		837,952
Grand total, excluding Allies ($p_b + p_c$)		1,007,673
Allies (incl. U.S. ground forces)	74,575	

The above refer to 31.7.1945 as do the following for sick:

British Army personnel in medical units under British Army administration	4,008
Other personnel in medical units under British Army administration	13,128

For the reason given we can regard the last as exclusively Colonial without serious error. The medical units to which the figures refer are general hospitals, malaria forward treatment units (M.F.T.U.) and convalescent depots *inside* the A.L.F.S.E.A. boundary. No information was available w.r.t. British Army sick in hospitals outside the A.L.F.S.E.A. boundary whether under British Army or India Army administration. Medical personnel figures refer to a month earlier (30.6.1945). A rough and ready split of the two broad categories distinguished in the treatment of Case 2 above on the basis of a nominal roll submitted by S.E.A.C. to A.M.D.1 gives:

	R.A.M.C.	*I.A.M.C.*	*Total*
Medical units (d_h)....	478	691	1,169
Others (d_{bc})	169	340	509

The ratio $d_h \div d_{bc} = 2 \cdot 3$ tallies fairly closely with the corresponding figure $2 \cdot 4$ for West Africa. On the basis of these figures we have:

$$M_b = 4{,}008 \div 169{,}721 = 0 \cdot 02362$$
$$\therefore R_{MM} = \frac{509}{1{,}007{,}673} + \frac{0 \cdot 02362\ (1169)}{17{,}136}$$
$$= 0 \cdot 002116$$
$$= 2 \cdot 12 \text{ M.Os. per } 1{,}000 \textit{ or } 1 \text{ M.O. per } 472 \text{ troops.}$$

M.E.F.

The situation in M.E.F. is more complex than the foregoing. We cannot disregard interchange between medical administration of British Army and Others. To the extent that we are entitled to disregard certain qualifications mentioned below, and to assume that British Army R.M.Os. are responsible only for British and Colonial (including Indian) troops, the appropriate model is therefore Case 3. It will suffice to cite figures as at 31.7.1945 for the relevant items by their appropriate symbols as specified in the schema given:

M.Os. $d_{bc} = 410$ $d_h = 186$
Sick $t_b = 14{,}052$
Strengths $p_b = 128{,}067$; $p_c = 126{,}257$; $t_p = 254{,}324$;
Morbidity Ratio $M_b = 0.02457$

In accordance with the formula cited for Case 3:

$$R_{MM} = \frac{410}{254{,}324} + \frac{0 \cdot 02457\ (186)}{14{,}052}$$
$$= 0 \cdot 001937$$
$$= 1 \cdot 94 \text{ M.Os. per } 1{,}000 \textit{ or } 1 \text{ M.O. per } 516 \text{ troops.}$$

The ratio of British Army M.Os. to British troops in this theatre $(d_{bc} + d_h) \div p_b = 0 \cdot 004654$, i.e. $4 \cdot 65$ per 1,000 *or* 1 M.O. to 215 troops, and the crude ratio of British Army

M.Os. to British and Colonial troops not adjusted w.r.t. differential morbidity $(d_{bc} + d_h) \div t_p = 0 \cdot 002343$, i.e. 2·34 per 1,000 *or* 1 M.O. per 427 troops.

Information from Statistical Section G.H.Q., M.E.F. was to the effect that: Civilians in the M.E., other than those entitled to medical treatment under para. 309 of Regulations for the Medical Services of the Army 1938, *only receive first aid treatment*. The number of such civilians was 243,740, while the number of those fully entitled was insignificant. The number of the former, however, which had in practice become the responsibility of Army medical officers (owing to their being situated where other facilities were not available) was fairly substantial: this number cannot be assessed. It must also be pointed out that Army medical officers were responsible to a large extent for hygiene and supervision of conditions in factories, a very large commitment in the M.E.

Note.—The strength figures used in the above are those supplied by A.G. (Stats.). Figures for a month earlier (30.6.1945) provided by Stats. Section G.H.Q., M.E.F. show:

$P_b = 159{,}816$; $p_c = 62{,}103$; $t_p = 221{,}919$

How far the discrepancy between the two sets of figures cited is attributable to substantial troop movements we have no certain means of deciding. If we take the June strength figures as a basis for calculation, we get:

$R_{MM} = 0 \cdot 00211$
$= 2 \cdot 11$ M.Os. per 1,000 *or* 1 M.O. per 474 troops.

It is suggestive to tabulate the two terms A and B shown separately on page 169, expressing each as the number of doctors per 1,000 troops.

	A	B
U.K.	1·59	1·69
M.E.F.	1·61	0·33
W.A.	0·80	1·54
A.L.F.S.E.A.	0·51	1·61

In the right hand column only the M.E.F. figures fall out of step, as also in the next table:

Number of Doctors per 1,000 *Patients in Medical Units*

U.K.	35·3 per 1,000	or 1 doctor per 28 patients
M.E.F.	13·2 „	„ „ „ 76 „
W.A.	59·1 „	„ „ „ 17 „
A.L.F.S.E.A.	68·2 „	„ „ „ 15 „

A possible reason for this is that figures relating to medical strengths, derived from a cable sent by the Stats. Section of that theatre, were defective. Figures for the three other theatres quoted are firm, being drawn from nominal rolls held by A.M.D.1. The detailed specification on the M.E.F. cable was:

Total medically qualified British Army officers

M. I. Rooms	371
Hospitals	186
Administration	39
Total	596

The wording of the cable thus suggested that:

(*a*) dilutees were probably excluded;

(*b*) the heading *M.I. Rooms* almost certainly included some M.Os. employed in C.R.Ss. etc., and therefore assignable to d_h rather than to d_{bc}.

A.M.D.1 in fact have a figure of 766 for the total M.O. strength of M.E.F. at this time; if this is taken and if the ratio $d_h \div d_{bc}$ be taken as the same as A.L.F.S.E.A. and W. Africa, i.e. 2·3, then we get $d_h = 534$ and $d_{bc} = 232$.

These figures give $R_{MM} = 0 \cdot 00091 + 0 \cdot 00093$
$= 0 \cdot 00184$
$= 1 \cdot 84$ M.Os. per 1,000 *or* 1 M.O. to 543 troops.

It will be seen that despite using a larger figure for the total number of doctors, the fact that a higher proportion of them are employed in hospitals enables the M.E.F. to receive full credit for the large numbers of non-British Army sick hospitalized by the R.A.M.C. in that theatre and the resultant R_{MM} is in fact lower.

The foregoing estimates refer to mid-year 1945. Relevant information w.r.t. basic data other than strengths was not available for C.M.F., E. Africa or B.A.O.R. at that time. The preceding analysis yields the following figures:

	R_{MM}	t_p
U.K.	3·28	1,331,263
W. Africa	2·34	58,907
A.L.F.S.E.A.	2·12	1,007,673
M.E.F.	1·94	254,324
C.M.F.	—	473,464
E. Africa	—	158,842
B.A.O.R.	—	750,154
Total		4,034,627

In U.K. the R_{MM} was higher than the crude ratio of British Army M.Os. to troops because the debt to E.M.S. exceeded the credit balance w.r.t. treatment of other personnel. In other theatres the reverse was true. This raises the question: How far did the credit balance in overseas theatres offset the debit in the U.K.? The appropriate answer to this would be the average of the separate values of R_{MM} weighted w.r.t. the proportionate contributions of the separate (t_p) to the entire population at risk. From figures available later in the year, we know that the overall value of R_{MM} for overseas theatres other than *ALFSEA* (2·1) and *W. Africa* (2·3) cannot have been greater than 2·0. Thus a rough estimate of the overall value of R_{MM} at mid-year 1945 for *all* theatres is 2·4 per thousand or 1 M.O. per 417 troops.

Tables 144 to 149 show the situation at the end of 1945. Figures in the first column of Table 144 based on nominal rolls from commands overseas represent effective working strengths, and these have been used in subsequent calculations in preference to theoretical commitments. At the same time, a more refined breakdown of the man-power budgeting figures for the British Army at home permits the analysis of employment of medical officers into the categories shown in Table 146. Broadly speaking, doctors shown under *Empire Base* were those concerned with the treatment of troops in U.K. static organizations, whereas the *Other* group includes doctors under training and those working with the Home Field Army and certain special establishments.

TABLE 144 **Strength of Medical Officers by Commands; 31st December 1945**

	Nominal Rolls Total	*A.M.D. 1 Return* Posted	*A.M.D. 1 Return* In Transit	*A.M.D. 1 Return* Total
B.A.O.R.	897	987	—	987
C.M.F.	731	801	73	874
M.E.F.	723	748	64	812
E. Africa	201	233	9	242
W. Africa	102	128	4	132
Malta	24	22	2	24
Gibraltar	14	15	1	16

TABLE 145 **Employment of Medical Officers Abroad; 31st December 1945**

	Administration and Consultants	Hygiene and Malaria Control	Regimental Medical officers	Forward Medical Units*	Casualty Clearing Stations and Reception Stations	Hospitals	P.W. Camps and Hospitals	Trooping and Hospital Ships	Ambulance Trains	Civil Affairs	Medically Non-effective and Unposted Reinforcements	Convalescent Depots	Total
B.A.O.R.	59	27	275	204	14	258	4	—	4	33	17	2	897
C.M.F.	48	37	186	97	25	293	20	9	2	11	3	—	731
M.E.F.	64	32	194	66	18	279	1	12	3	29	20	5	723
E. Africa	12	8	59	12	—	91	1	—	—	13	2	3	201
W. Africa	7	6	12	3	3	70	—	1	—	—	—	—	102
Malta	1	1	9	—	—	13	—	—	—	—	—	—	24
Gibraltar	1	1	2	—	—	10	—	—	—	—	—	—	14

*Includes Field Ambulances, Field Dressing Stations, Field Surgical Units and Forward Treatment Units

TABLE 146

Employment of Medical Officers in the U.K.; 31st December 1945

I. EMPIRE BASE		II. OTHER	
Staff	131	Training Organization	116
Research	5	Reserve Organization	21
Laboratories	10	Miscellaneous Establishments	21
Military Hospitals	555	Home Field Army	72
R.S., C.R.S. and A.T.S. R.S.	323	A.A. Command	1
Home Psychiatric Pool	60	Held and Under Training	417
Convalescent Depots	34	Seaborne	99
Other	602		
TOTAL	1,720	**TOTAL**	747
GRAND TOTAL=2,467			

TABLE 147

Proportion of M.Os. Employed in Certain Duties; 31st December 1945

	Hospitals	Field Medical Units	Other Duties	Total
U.K. (All)	22·5	13·1	64·4	100·0
U.K. (Empire Base only)	32·3	18·8	49·0	100·0
B.A.O.R.	28·8	24·3	46·9	100·0
C.M.F.	40·1	16·7	43·2	100·0
M.E.F.	38·6	11·6	49·8	100·0
E. Africa	45·3	6·0	48·7	100·0
W. Africa	68·6	5·9	25·5	100·0
Malta	54·2	—	45·8	100·0
Gibraltar	71·4	—	28·6	100·0

TABLE 148

Patients per M.O. Employed in Certain Units; 31st December 1945

	Hospitals	Field Medical Units and Reception Stations
U.K.	13·0	8·5
B.A.O.R.	21·3	8·5
C.M.F.	21·9	6·0
M.E.F.	39·0	15·0
E. Africa	24·8	32·7
W. Africa	13·9	8·5
Malta	14·2	—
Gibraltar	11·7	—

TABLE 149

Medical Man-power Ratios—31st December 1945; M.O.s per 1,000 Troops

Theatre	R_{MM}	Crude Ratio w.r.t. British Troops only	Crude Ratio w.r.t. British and Colonial Troops
B.A.O.R.	1·5	1·6	1·6
C.M.F.	1·9	2·2	2·2
M.E.F.	1·7	4·0	2·3
E. Africa	1·4	16·5	1·7
W. Africa	2·4	22·7	2·2
U.K. (All)	4·2	2·4	—
U.K. (Empire Base only)	3·2	1·7	—

§2 ALLOCATION OF NURSING OFFICERS—END OF 1945

THE foregoing section sets forth an approximate budget of medical man-power in 1945. The computation of an index appropriate to the allocation of Nursing Officers to the British Army raises no issues essentially different from those implicit in the build-up of R_{MM}. Since we may safely regard all nurses as employed in medical units holding domiciliary sick, only the second half of the relevant R_{MM} formula (§1) is requisite for the presentation of a true bill; but it may be as well to recapitulate the argument. Where British Army hospitals care for non-British Army sick, *excluding* colonial forces, and some British Army sick receive treatment in *other* Medical Units, our schema is as below:

In this case n_t nurses care for $s_b + s_{ob}$ patients. The allocation of nurses per patient is therefore $n_t \div (s_b + s_{ob})$.

In an autarchical situation there would be $(s_b + s_{bo})$ British sick, who would consequently require $n_t (s_b + s_{bo}) \div (s_b + s_{ob})$ nurses for their attention. So the allocation to the total British force would be :—

$$\frac{n_t (s_b + s_{bo})}{(s_b + s_{ob})\, p_b}$$

Where colonial sick are involved, we have to adjust our ratio to the situation by estimating what number of sick would require care, if Colonial Troops were replaced by British. The argument proceeds as in §1, and further recapitulation is unnecessary. By applying these formulae we arrive at the results shown in Table 150. On a patient per officer basis, there are *about one third as many patients per Nursing Officer as per M.O.*

All Nursing Officers	Total Strength British Troops	BRITISH ARMY SICK: In British Army Medical Units	BRITISH ARMY SICK: In Other Medical Units	OTHER SICK: In British Army Medical Units
n_t	p_b	s_b	s_{bo}	s_{ob}

TABLE 150

Strength and Medical Man-Power Ratios w.r.t. Nursing Officers; 31st December 1945

Theatre	Nursing* Strength	R_{MM} per 1,000 Troops	Patients per Nursing Officer
U.K.	1,807	4·79	5·0
B.A.O.R.	743	1·18	7·4
C.M.F.	853	1·99	7·5
M.E.F.	783	1·09	13·9
E. Africa	166	0·89	13·6
W. Africa	102	2·41	9·5
Other Theatres	3,624		
Total	8,078		

*Includes Civil Affairs and medical non-effectives.

§3 ALLOCATION OF ACCOMMODATION IN MEDICAL UNITS—END OF 1945

THE accountancy of what we commonly refer to as the *bedstate* of the British Army has two facets, in so far as we may be concerned with:

(*a*) the operational issue involved in prescribing the requirements of a changing situation during the build-up of a new theatre;

(*b*) the more straightforward issue of presenting a budget which comprehensively exhibits the various commitments of Army medical administration in a *steady state*.

The first is as complex as the data relevant to the attainment of equilibrium between accommodation for casualties and casualty rates are various when the total population at risk is rapidly changing, especially because the relevant data are themselves subject to gross variation inherent in the nature of the operation. In this context we are concerned only with the second issue specified above, in so far as:

(*a*) the extent of the commitments of Army medical administration calls for availability of certain basic data;

(*b*) the design of documents which can make it possible to assess the extent of such commitments presupposes that such data are in fact available.

The basic data relevant to either the one or the other became available only as the result of changes in the lay-out of A.F.W. 3180 for the U.K. and the Statistical Returns of Monthly Hygiene Reports, since replaced by A.Fs. W3166-7 for general use in Overseas theatres and in the U.K. The essential innovation entailed is a clear-cut specification of:

(*a*) the extent of the commitments of British Army medical administration for personnel other than of the British Army *sensu stricto*;

(*b*) the extent of care for British Army personnel undertaken by medical units *not* under British Army medical administration.

Given the availability of documents which do in fact disclose these data, we can provide a true bill both for beds occupied in British Army medical units by British Army or other personnel and for beds which would be occupied if British Army medical units were responsible only for British Army personnel and British Army personnel received treatment only in such units. The administration can then prescribe the requisite number of beds equipped with due consideration to the appropriate safety margin between equipped beds and beds occupied in a static situation involving specified commitments of British Army administration on the one hand and of medical units *not* under British Army medical administration on the other. It is beyond the scope of available medical statistics to provide information bearing on what the safety margin should be, except in so far as they can clarify how far any mean figure is subject to variation arising from seasonal, local or operational circumstances, which do not concern us in this preliminary stage of enquiry. Beyond this, there are other pertinent considerations arising *inter alia* from local distribution of units *vis-a-vis* lines of communication.

As emphasized in a previous section on the allocation of medical man-power, it has been impossible in the past to get a clear picture of British Army requirements owing to lack of documentary data w.r.t. British sick treated by medical units NOT under British Army administration and other sick (including locally recruited Colonial troops) treated in British Army medical units. For the latter half of 1945, we have such data at our disposal, and it is therefore possible to present a budget of bedstates with due regard to commitments of both kinds. Such a picture presupposes information of three sorts:

(i) What proportion (P_1) of British Army sick are dealt with in British Army medical units?

(ii) What proportion (P_2) of beds occupied in British Army medical units are occupied by British Army patients?

(iii) What proportion (P_3) of occupied beds in British hospitals would still be in use if both outside help and outside commitments vanished?

The following schema *en rapport* with one employed in a previous treatment of Medical Manpower (§1) displays the relevant data.

British Army Personnel		*Other Personnel*
Sick in Brit. Army Medical Units	*Sick in Other Medical Units*	*Sick in Brit. Army Medical Units*
s_b	s_{bo}	s_{ob}

With these symbols the indices specified above expressed as percentages are more precisely definable thus:

(i) $P_1 = 100\, s_b \div (s_b + s_{bo})$

(ii) $P_2 = 100\, s_b \div (s_b + s_{ob})$

(iii) $P_3 = 100\, (s_b + s_{bo}) \div (s_b + s_{ob}) = 100\, (P_2 \div P_1)$

For simplicity, we here consider a Medical Unit of the British Army as a clearly defined entity. Unfortunately this is not necessarily so. Two complications arise:

(i) War establishments are so devised that British Military Hospitals of a given size may be expanded by grafting on "extensions" of so many beds. Such extensions may be added specifically to deal with personnel other than British Army, but are not necessarily staffed by R.A.M.C. personnel alone. Thus a British General Hospital in M.E.F. may be equipped for British Army cases with two extension wings, one staffed by R.A.M.C. to deal with British Africans, and the other dealing with Ps.W. staffed by Ps.W. and calling on the R.A.M.C. solely for administration and specialist consultation;

(ii) In the Far East most hospitals at the end of 1945 were Combined General Hospitals operated jointly by R.A.M.C. and I.M.S. Although beds in such hospitals are equipped for fixed numbers of British and Indian troops, the numbers of R.A.M.C. and I.M.S. officers are not as a rule in the same proportion as the numbers of patients assignable to the British Army and the Indian Army.

For unavoidable reasons inherent in the paucity of documentary data, figures available for what follows specify foreign extensions in M.E.F. as British, but place Combined General Hospitals in A.L.F.S.E.A. among *Others*. This apparent inconsistency arises from a defective method of submitting available figures; but does not seriously affect the main argument. Tables 151-155 summarize the bedstate situation in different types of medical units in all parts of the world except India as at 31st December, 1945.

Summary

The salient features of the tables accompanying this section are as follows:

(*a*) In all overseas commands except A.L.F.S.E.A. and N. Caribbean Area on 31st December, 1945, more than 95% of hospitalized British Army sick received treatment in British Army hospitals. Less than (in most Commands far less than) 90% of beds occupied would be in use if British Army hospitals exclusively

treated their own sick, and British Army sick were exclusively treated in British Army hospitals. In M.E.F. and C.M.F. the number of occupied beds would be respectively reduced to 25% and 75% if there were no external and internal commitments.

(*b*) In A.L.F.S.E.A., less than 30% of British Army sick received treatment in R.A.M.C. hospitals; but the net effect of external and internal commitments is impossible to assess on the basis of extant documentation because of the existence of *combined* general hospitals.

(*c*) In the U.K., about one quarter of British Army sick received treatment in military hospitals, the remainder almost entirely in E.M.S. hospitals. But for the latter it would have been necessary for military hospitals to find accommodation for over three times as many sick as in fact occupied beds therein.

(*d*) About 45% of all British Army hospitalized sick were accommodated in R.A.M.C. hospitals. If external and internal commitments ceased to exist, the number of occupied beds would have been 25% greater. For overseas commands as a whole it would have been 40% less. This difference largely arises from the contribution of the E.M.S.

(*e*) The proportion of British Army convalescents in R.A.M.C. convalescent depots under overseas commands was about 55%, in the U.K. 70%. If all British Army convalescents received treatment in R.A.M.C. units which themselves took in no other convalescents, the beds occupied would increase by about 30% overseas and 40% for the Army as a whole.

(*f*) Over 90% of British sick in lower medical units (reception stations etc.) in overseas commands as a whole and in the U.K. received R.A.M.C. treatment; but such sick constituted less than 65% of all sick in these units overseas and less than 90% at home, Thus, beds occupied in all R.A.M.C. units at this level would have been 25% less if there had been no external or internal commitments.

TABLE 151

Beds Equipped by the R.A.M.C.; All Countries except India; 31st December 1945

	Hospitals	Convalescent Depots	Other Units
B.A.O.R.	11,700		4,988
M.E.F.	18,013(1)	1,970	4,123
C.M.F.	10,870	100	1,829
A.L.F.S.E.A.	1,800(2)		
E. Africa	6,887	99	739
W. Africa	2,350	—	90
Gibraltar	600	—	—
Malta	625(3)	—	25
N. Caribbean	137	—	60
A.L.F. Norway	—	—	15
Bermuda	38	—	2
S. Africa	1,032	216	—
S. Caribbean(4)			
TOTAL OVERSEAS (Excl. India and S. Caribbean)	54,052	2,385	11,871
U.K.	14,871	12,735	9,926
WORLD TOTAL	68,923	15,120	21,797

(1) Includes beds under the control of D.M.S., M.E.F. equipped for African, Polish and Greek Troops, T.J.F.F. and Ps.W. These are not wholly staffed by R.A.M.C.

(2) British General Hospitals only. Combined General Hospitals, though partially staffed by R.A.M.C., are counted as "other" hospitals for this present paper.

(3) Includes 25 equipped for military families.

(4) Figures not available.

TABLE 152

British Army Bedstate; all Countries except India; Hospitals as at 31st December 1945

	BRITISH ARMY SICK		OTHER SICK			
	In R.A.M.C. Hospitals (S_b)	In Other Hospitals (S_{bo})	In R.A.M.C. Hospitals (S_{ob})	P_1	P_2	P_3
B.A.O.R.	4,761	129	729	97·4	86·7	89·0
M.E.F.	2,630	27	8,249	99·0	24·2	24·4
C.M.F.	4,761	4	1,659	99·9	74·2	74·3
A.L.F.S.E.A.	942	2,351	40	28·6	95·9	335·3
E. Africa	151	—	2,110	100·0	6·7	6·7
W. Africa	105	—	867	100·0	10·8	10·8
Gibraltar	57	—	60	100·0	48·7	48·7
Malta	57	1	127	98·3	31·0	31·5
N. Caribbean	32	10	81	76·2	28·3	37·1
S. Caribbean						
A.L.F. Norway	—	—	—			
L.F. Hong Kong	—	137	—			
Bermuda			3	—	—	—
St. Helena	3	—	—	—	—	—
S. Africa	382	19	312	95·3	55·0	57·7
TOTAL OVERSEAS (Excl. India and S. Caribbean)	13,881	2,678	14,237	83·8	49·4	58·9
U.K.	7,166	22,766	1,858	23·9	79·4	331·7
WORLD TOTAL	21,047	25,444	16,095	45·3	56·7	125·2

TABLE 153

Non-British Army Sick in R.A.M.C. Hospitals Overseas (excl. India) as at 31st December 1945

	Soldiers' Families	Locally Enlisted and Colonial Troops	Indian Army	R.N. and R.A.F.	Others	TOTAL
B.A.O.R.(1)						(729)
M.E.F.(2)	—	2,258	2,038	947	3,006	8,249
C.M.F.	8	446	198	425	582	1,659
A.L.F.S.E.A.	—	—	2	—	38	40
E. Africa	—	1,982	—	32	96	2,110
W. Africa	—	832	—	25	10	867
Gibraltar	—	—	—	39	21	60
Malta	10	39	—	48	30	127
N. Caribbean	—	50	—	31	—	81
Bermuda	—	2	—	—	1	3
S. Africa....	—	4	24	169	115	312
TOTAL (*Excl.* B.A.O.R.)	18	5,613	2,262	1,716	3,899	13,508
TOTAL (*Excl.* B.A.O.R.) as %	0·1	41·6	16·7	12·7	28·9	100

(1) Figures not available. (2) Estimated from December admissions.

TABLE 154

British Army Bedstate; All Countries except India; Units other than Hospitals as at 31st December 1945

I. Convalescent Depots

	BRITISH ARMY SICK		OTHER SICK			
	In R.A.M.C. Con. Depots	In B.R.C.S. and Other Con. Homes	In R.A.M.C. Con. Depots	P_1	P_2	P_3
1. All Overseas Commands	524	404	181	56·5	74·3	131·5
2. U.K.	7,477	3,104	21	70·7	99·7	141·1
3. World Total	8,001	3,508	202	69·5	97·5	140·3

II. Other Medical Units (C.R.S., C.C.S., Etc.)

	BRITISH ARMY SICK		OTHER SICK			
	In R.A.M.C. Units	In Other Units	In R.A.M.C. Units	P_1	P_2	P_3
1. All Overseas Commands	2,761	269	1,706	91·1	61·8	67·8
2. U.K.	2,735	6	342	99·8	88·9	89·1
3. World Total	5,496	275	2,048	95·2	72·9	76·5

TABLE 155

British Army Bedstate; All Countries except India; All Medical Units as at 31st December 1945

	BRITISH ARMY SICK		OTHER SICK			
	In R.A.M.C. Units	In Other Units	In R.A.M.C. Units	P_1	P_2	P_3
1. All Overseas Commands	17,166	3,351	16,124	83·7	51·6	61·6
2. U.K.	17,378	25,876	2,221	40·2	88·7	220·7
3. World Total	34,544	29,227	18,345	54·2	65·3	120·6

§4 REQUIREMENTS OF DENTAL MAN-POWER

THIS section is the outcome of an enquiry undertaken at the request of the Director, Army Dental Service, to provide answers to the following questions:

(i) How many recruits should be allotted to one dental officer to ensure that 100% of recruits are rendered dentally fit during their first 3½—4 months service; and what would be the effect of taking as the target 75% dental fitness?

(ii) How many trained soldiers overseas should be allotted to one dental officer to ensure that 75% of them remain dentally fit; and what would be the effect of taking as the target 50% dental fitness?

(iii) How many trained soldiers in the U.K. should be allotted to one dental officer to ensure that 75% of them remain dentally fit; and what would be the effect of taking as the target 50% dental fitness?

Basic data to hand for this purpose come from returns of inspections of recruits at entry, made to the Director, Army Dental Service, as also of recruits after 3½-4 months service, and trained soldiers in the U.K., C.M.F., and M.E.F. Among other information recorded is the number of visits required to make the soldier dentally fit. (See Chart 34.) The number of troops per dental officer in the different groups is also available. We have thus two relevant classes of variables:

(*a*) Relative strengths of dental officers;

(*b*) Relative frequencies of cases requiring 0, 1, 2, etc., visits to complete treatment.

Requirements for Recruits

The questions we here ask are:

How many recruits should be allotted to one dental officer to ensure that 100% *of recruits are made dentally fit during their first* 3½-4 *months service? What would be the effect of lowering the target to* 75% *or some proportion between* 75% *and* 100%?

The returns mentioned show that 4·8% are dentally fit (i.e. require no treatment) on the first inspection after enlistment. For calculating the number of visits, it is assumed that men who require 2-3 need 2½ on the average and those who require 4 or more need 5. In addition, every man has been allotted ⅓ of a visit, to allow for the preliminary inspection. The analysis of a sample of 987 recruits throughout the U.K. is then as follows:

	Recruits No.	Recruits %	No. of visits required per 100 men
Fit (0·3̇ visit)	47	4·8	1·6
1 visit (1·3̇)	211	21·4	28·5
2-3 visits (2·83̇)	462	46·8	132·6
4 or more (5·3̇)	267	27·0	144·0
	987	100·0	306·7

On the average these men serve about 3½ months before they complete their training as recruits. Normal deterioration of teeth during this period may reasonably be assumed to account for about 10-20 more visits per 100 men. Thus an adjusted figure of 320 visits per 100 men will be close to the mark.

Analysis of recruits (not same group, but a similar one) at the end of their training yields the following figures:

	Completed Training No.	Completed Training %	No. of visits required per 100 men
0 visits	528	52·4	—
1 visit	346	34·3	34·3
2-3 visits	98	9·7	24·2
4 or more	36	3·6	18·0
	1,008	100·0	76·5

The number of visits is calculated as before, without the 33·3% allowance for the preliminary inspection. The operative scale of dental officers for recruits is 1 per 720 recruits p.a. Presumably therefore a group of 720 recruits will require 7·2 × 320 = 2,304 visits, the number assumed under the scale in force to occupy the time of one dental officer. Of this programme he completes 2,304 — (7·2 × 76·5) = 1,753, leaving 551 undone. Thus the scale required to secure 100% fitness is therefore $720 \times \frac{1,753}{2,304}$ = 548 men per dental officer.

This estimate takes no stock of the fact that figures for home commands differ materially. A similar calculation carried out for the separate commands yields the following:

	COMMAND Western	Southern	Eastern	Northern	Scottish
Recruits at 1st Inspection—					
% needing 0 visits	1·0	5·7	11·7	2·5	2·9
Ditto 1 visit	8·8	26·3	34·0	16·6	21·1
Ditto 2-3 visits	51·3	44·3	41·6	50·8	46·1
Ditto 4 or more visits	38·9	23·7	12·7	30·1	29·9
	100·0	100·0	100·0	100·0	100·0
No. of visits required per 100 recruits	364·8	288·9	234·8	327·4	319·2
Adjusted No. of visits	380	305	250	340	335
At end of Recruits' Training—					
% needing 0 visits	44·9	46·0	55·5	55·0	61·2
Ditto 1 visit	34·1	42·4	29·0	33·0	33·2
Ditto 2-3 visits	13·1	11·6	11·0	9·0	3·6
Ditto 4 or more visits	7·9	—	4·5	3·0	2·0
	100·0	100·0	100·0	100·0	100·0
No. of visits	106·4	71·4	79·0	70·5	52·2
No. of recruits p.a. per dentist to ensure 100% fitness	519	552	492	572	608

For practical purposes great refinement of computation is not essential. It thus seems legitimate to regard 1 dental officer to 550 recruits p.a. as a number suitable if the end in view is to ensure that 100% of the recruits are dentally fit when they have finished training. This is the answer to the first part of the question stated at the beginning of this section; but the figures available bear on another issue. Though a scale of 1 dental officer to 720 recruits p.a. ensures that only 52% of the recruits are dentally fit by the end of the training period, the full value of the work done by the dentist is masked by this index, since it gives no weight to a very substantial improvement of the dental health of the remaining 48%.

A satisfactory answer to the second part of the question cited at the beginning of this section is more difficult to obtain; but the following considerations justify an approximate estimate:

(*a*) Since there is far less difference between the different Commands at the end than at the beginning of training, it looks as if dental officers work off the worst cases first;

(*b*) We may assume that it will be harder to ensure dental fitness of the terminal 5% (i.e. from 95% to 100%) than that of the initial (i.e. from 52% to 57%).

These two considerations guide us in calculating interpolated figures, viz.:

Target percentage fit	*Scale of Dental Officers*
52	1 to 720 recruits p.a.
65	1 „ 670 „ „
75	1 „ 630 „ „
80	1 „ 610 „ „
85	1 „ 590 „ „
90	1 „ 575 „ „
95	1 „ 560 „ „
100	1 „ 550 „ „

Requirements for Trained Soldiers Overseas

The questions we here ask are:

How many trained soldiers overseas should be allotted to one dental officer to ensure that 75% of trained soldiers stay dentally fit? What would be the effect of lowering the target to 50% or some proportion between 50% and 75%?

For this purpose C.M.F. and M.E.F. were chosen as two representative forces, in which most of the troops had seen long continuous overseas service. The operative scales of dental officers in these two theatres were respectively 1 to 2,600 and 1 to 1,500. For purposes of computation, we have to subdivide our mean figures, and shall here suppose that dental states may be subdivided thus: (*a*) those recorded as needing 0 visits include at one extreme the minute proportion absolutely fit, and at the other borderline cases whose requirements we may assign as ½ a visit; (*b*) those recorded as needing one visit include those to which we assign at one extreme ½ a visit and at the other 1½ visits; (*c*) those needing 2-3 visits include those to which we assign from 1½ to 3½; (*d*) those needing 4 or more visits include those to which we assign more than 3½.

Proceeding in this way, we replace the cruder classification adopted in the returns by a more refined grading, and can then tabulate the numbers of soldiers in percentages requiring visits up to any chosen number, as shown in the first three columns of the following table:

No. of Visits (*n*)	*Percentage requiring n visits or less* (*C.M.F.*)	*Percentage requiring n visits or less* (*M.E.F.*)	*C.M.F. percentages adjusted to M.E.F. scale*
(1)	(2)	(3)	(4)
0·0	0	0	0
0·25	23	25	25
0·5	36	41	41
0·75	48	55	54
1·0	58	67	65
1·25	67	73	74
1·5	74	79	79
1·75	78	83	82
2·0	81	86	84
2·5	84	88	88
3·0	88	91	92
3·5	92	93	93
4·0	93	94	95
5·0	95	96	96

The figure in Column 4 corresponding to n in Column 1 is the figure derived from Column 2 (by interpolation if necessary) corresponding to $1\cdot2 \times n$ in Column 1. Thus, to find the figure in Column 4 corresponding to 2·5 visits, we multiply 2·5 by 1·2, getting 3; against 3 in Column 1 we find 88 in Column 2, which is accordingly entered against 2·5 in Column 4. The operation is the same as drawing the graph of Column 2 against Column 1 and reducing the horizontal scale in the ratio of 1 to 1·2. The correspondence between Columns 3 and 4 is very striking; and though reached by a procedure which is not self-explanatory, has a simple meaning, *viz.* in the longer intervals between visits in C.M.F. dental condition has deteriorated approximately 1·2 times as much as in the shorter intervals in M.E.F., *and this is equally true fo groups of men whose condition naturally deteriorated rapi and for those whose condition deteriorated slowly.*

In dealing with the third question, below, we shall s that this fact is not so obvious as might appear. It i important for our present purpose because it enables u to predict with some confidence the result of altering th scale of dentists. For it implies that the extent of den deterioration depends in the simplest possible way on tw factors which are independent:

(*a*) peculiar to the man himself;

(*b*) depending on the average amount of dental officer time available for each man.

With M.E.F. (1 dental officer to 1,500 men) as our standard, we take (*b*) as 1, and for C.M.F. (1 dental officer to 2,600 men) it is 1·2. We may estimate factor (*b*) according to the following table.*

Scale of Dental Officers (1)	*Factor* (*b*) (2)
1 to 480	0·00
1 to 500	0·06
1 to 550	0·18
1 to 600	0·29
1 to 700	0·46
1 to 800	0·59
1 to 900	0·69
1 to 1,000	0·76
1 to 1,500	1·00
1 to 2,000	1·12
1 to 2,600	1·20
1 to 3,000	1·24
1 to 5,000	1·33

*For a note on the method used *see below*.

For our present purpose we may combine the content of the last two tables of the text by reversing the procedure employed to derive Column 4 of the last table but one from Column 2, i.e., by entering against *n* in Column 1 values in Column 2 corresponding to 1·2 *n* to get what C.M.F. percentage requirements would be if C.M.F. had as many dental officers per unit strength as M.E.F. If we multiply the figures in Column 1 by any one of the numerical values of factor (*b*) set out in the subsequent table, we can obtain a new set of values for Column 1 of the previous one, and hence percentages of men needing a given number of visits for a given scale of dental officers corresponding to a particular value of factor (*b*). One example will suffice. For a scale of 1 dental officer per 3,000 troops the last table cites (*b*) as 1·24. The previous table shows 83% troops in Column 3 against 1·75 visits in Column 1. Accordingly, we derive the figure $1 \cdot 75 \times 1 \cdot 24 = 2 \cdot 17$ for the maximum number of visits which 83% of the men require. Given a standard of dental fitness, here taken as consistent with a number of requisite visits not exceeding 0·5, we can then determine the scale of dental officers appropriate to a given level, e.g. 50% or 75% dental fitness, as below:

Target percentage fit	*Scale of Dental Officers*
50	1 to 989, or, say, 1,000
55	1 to 880, or, say, 900
60	1 to 798, or, say, 800
65	1 to 746, or, say, 750
70	1 to 689, or, say, 700
75	1 to 646, or, say, 650

Requirements for Trained Soldiers in U.K.

We have now to ask:

How many trained soldiers in U.K. should be allotted to one dental officer to ensure that 75% of them stay dentally fit? What would be the effect of lowering the target to 50% or some proportion between 50% and 75%?

At home the operative scale of dental officers was 1 to 1,400 and the following table shows the proportions of men requiring different numbers of visits:

Percentage of men requiring *n* visits or less.

No. of Visits (*n*)	5 *Home Commands*	" *Best* " *Home Command*	" *Worst* " *Home Command*
0·0	0	0	0
0·25	19	27	11
0·5	35	43	22
0·75	45	56	32
1·0	54	67	41
1·25	62	76	49
1·5	68	83	57
1·75	73	87	63
2·0	77	89	68
2·5	81	92	79
3·0	86	95	87
3·5	89	97	94
4·0	93	98	98

As compared with the simple relationship between C.M.F. and M.E.F. these results are anomalous, but the " best " home Command accords well with what we should expect on the basis of arguments outlined above. Agreement with respect to " worst " home Command and the " 5 home Commands " is very crude; and the " worst " excels the average if we confine our attention to men who need higher numbers of visits, a feature compensated by anomalies in the other three Commands. With such information as we have at our disposal, we have to make the best use we can of the same methods as before with due regard to the fact that special circumstances operated at home. For instance, there was a larger proportion of older and/or low medical category men; and there had been concentration of dental work on behalf of 21 Army Group. The 75% fitness target for the 5 Commands falls between 1·75 and 2 visits. Thus the value of " *n* " needs to be reduced in the proportion of $\frac{0 \cdot 5}{1 \cdot 875} = 0 \cdot 27$. This yields a scale of 1 dentist to 590 trained soldiers. The corresponding figures for the " best " and " worst " Commands are 1 dentist to 667 and 564 respectively. We may thus take 1 to 600 as a reasonable figure. In the light of the answer given above, the following figures may be cited as the most plausible answer available for the second part of the question we are considering.

Target percentage fit	*Scale of Dental Officers*
50	1 to 900
55	1 to 800
60	1 to 750
65	1 to 700
70	1 to 650
75	1 to 600

Since the end in view was to furnish answers to administrative questions, the arguments are intentionally brief. It is fitting, however, to be more explicit on certain assumptions. Thus the observed figures serve to fix only the two values of factor (*b*) corresponding to dental scales of 1 : 1,500 and 1 : 2,600; and it is therefore proper to ask with what justification we may legitimately extrapolate therefrom. Clearly, there must be some level at which factor (*b*) drops to zero, and in taking this as the one

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which corresponds to the 1 : 480 scale we proceed in conformity with a straight line fit for the reciprocal of factor (*b*). That the outcome is reasonable follows from the figures relating to recruits. For the range relevant to the questions posed at the outset, more refined mathematical treatment is of trivial value.

Summary

With due regard to limitations stated, the conclusions derived from the foregoing examination are :

(*a*) If the target is 100% fitness by the end of a training period of $3\frac{1}{2}$ months, a scale of about 550 trainees p.a. per dental officer is necessary in the U.K. To ensure 75% fitness the requisite scale is about 630 trainees p.a. per dental officer. One dental officer to 720 trainees p.a. barely suffices to ensure a 50% standard. A more generous scale might prove to be necessary in an army composed mainly of volunteers.

(*b*) For trained soldiers in the U.K., one dental officer per 900 ensures 50% fitness, and one dentist per 600 is necessary if the target is 75%.

(*c*) To maintain the 50% standard overseas the scale is 1 per 1,000. If the target is 75% fitness, it is 1 dentist to 650 men.

Part VIII. SURGICAL CASUALTIES

NOTE: A statistical analysis of the medical aspect of battle casualties presents peculiar difficulties, and could be undertaken only after appropriate machinery had been evolved at the War Office. For this reason, the first four Sections of Part VIII. have been devoted to an intensive study of casualties during the first two months of the Normandy campaign. Section 5 shows in less detail data for other theatres of war.

§1 THE ASSESSMENT OF BATTLE CASUALTIES IN THE NORMANDY CAMPAIGN; JUNE–JULY 1944

THIS Section, in common with Sections 2 to 4, refers to battle casualties among British troops of 21 Army Group during June and July, 1944. It covers the landing on the Normandy beaches and the subsequent close country fighting in the bocage country of the bridgehead. It does not cover the mobile war following the final breakout. It was therefore a period of good recovery of wounded and short evacuation through forward medical units. Hospital attention was available in the bridgehead, but owing to the necessity for keeping it so, all casualties requiring hospital accommodation were evacuated as soon as possible to the U.K.

What follows is concerned with estimating the number of troops rendered non-effective during the battle. It is not concerned with those killed outright, but is intended to show the total number that had to be sent back from the battlefield for any medical reason.

The documentary sources were individual case records, respectively compiled at Forward Medical Units (A.F. W3118) and in hospital (A.F. I1220). In forward areas, one Field Medical Card (A.F. W3118) is prepared for each patient, initially by the first medical officer who attends him. It records regimental particulars, diagnosis and notes on clinical progress, and remains with the patient while in a medical unit. On arrival in hospital the patient sees a specialist who confirms the diagnosis. His particulars are entered at this stage on the Hospital Record Card (A.F. I1220), to which the A.F. W3118 is attached. Throughout his further progress in Hospital and Convalescent Depot his relevant clinical history is entered on A.F. I1220. On discharge the patient's documents are sent to the War Office.

It follows that cases not evacuated beyond forward medical units, either because they returned to duty from there or because they died, are recorded only on A.F. W.3118. Since military General Hospitals in France during the period under review acted almost exclusively as Casualty Clearing Stations, and were, in fact, keeping their clinical histories on A.Fs. W3118, cases which received medical attention solely in France were recorded entirely on A.F. W3118, and those which required hospital treatment were evacuated to the U.K. to be recorded on A.F. I1220. A.Fs. W3118 were therefore soon available in the War Office; but it was necessary to wait for a considerable period before complete rendition of A.Fs. I1220. A.Fs. W3118 were sampled directly from the sealed bags as received at the War Office. To start with, sampling procedure was truly random, *i.e.* contents of bags were thoroughly mixed before sorting. Data of this first sort were separately recorded. Since the sample of officers and N.C.O.s obtained therefrom was too small for further break-down, these groups were built up for a second sort by extracting cards referring specifically to these classes.

Analysis of a 10% sample of A.Fs. I1220 was made by use of the Hollerith machinery, cards used being those on which the Army Number cited ended in the digit 5, and received before February 25th, 1945. This was supplemented by direct sorting of cards as they arrived at the War Office until 9th April. It is known that this sample is incomplete inasmuch as a small proportion of men wounded during June—July were not then out of hospital, and there is delay between the date of discharge from hospital and arrival of A.F. I1220 at the War Office.

Figures based on the A.F. I1220 sample are, therefore, to some extent biased in favour of the exclusion of the longer term cases. The sample includes men wounded over the 8 week period 6th June, 1944—31st July, 1944, and would, therefore, include all cases remaining not more than 34 weeks in hospital or Convalescent Depot, if:

(*a*) rendition were complete;

(*b*) individual cards were complete on receipt;

(*c*) there were no appreciable time lag involved in transmission of the documents to War Office.

A leakage of A.Fs. I 1220 is known to exist from the smaller E.M.S. hospitals and probably involves relatively more short than long term cases, since the latter pass through Convalescent Depots, which check the receipt of documents from the patient's hospital. If we assume that the time lag involved in transmission is rarely greater than 4 weeks, our sample should include nearly all cases whose total stay in medical units did not exceed 7 months.

The following consolidation of arms of the service is based roughly upon employment of the various arms involved and their relative position on the battlefield:

1. Armoured Forces .... Household Cavalry; R.A.C.; Recce.
2. Artillery .... Royal Artillery Field; Anti-Tank; Others.
3. Infantry .... All Infantry Regiments; Motor; M.G. and specialised; Guards; Commandos; Army Air Corps, Parachute Regiments, Glider Regiments and S.A.S.
4. Forward Services .... R.E.; R. Signals; R.A.M.C. (and A.D.C.).
5. Others .... R.A.S.C.; R.A.O.C.; R.E.M.E.; Pioneer Corps; Others.

Proportions of wounded treated in the field and evacuated to hospital can be assessed only by reference to sources of information other than A.Fs. W3118 and I1220. The

responsible Adjutant-General's branch (A.G. (Stats.)) records figures for battle casualties based on regimental reports to Second Echelon; and a medical branch (A.M.D. 12), received figures for casualties evacuated to the U.K. Since all hospitalized cases were evacuated to the U.K. during the period under review, the A.M.D. 12 figures subtracted from the total given by A.G. Stats. might be assumed to give us the number of cases treated in forward units. This is not wholly true, because of disparity with respect to definition of casualties. The total figure for wounded given by A.G. (Stats.) includes besides personnel wounded by direct enemy action, persons injured by the following:

(i) blast;
(ii) concussion due to blast;
(iii) blast injury;
(iv) accidental injuries sustained in action or in proximity to the enemy; also accidental injuries which are not sustained in action or in proximity to the enemy provided they are caused by fixed apparatus (e.g. land mines) laid as defence against the enemy, as distinct from those employed for training purposes, and provided the personnel injured are on duty and not to blame.

It does *not* include:

(i) exhaustion, nervous or physical;
(ii) anxiety neurosis;
(iii) hysteria;
(iv) accidental injuries sustained in forward areas but not in action or in proximity to the enemy.

Thus, A.G. (Stats.) definition of wounded is *juridical* rather than medical, being based on the victim's employment at the time of sustaining injury. In issuing their figures, A.G. (Stats.) do running corrections by transferring from "Wounded" to "Killed" individuals notified as *Died of Wounds* up to the date of issue. Since some individuals die of wounds after admission to medical units, it is necessary therefore to add the corresponding figure to the total wounded in order to get a figure comparable by definition to that derived from medical sources:

	Offrs.	*O.Rs.*	*Total*
"Wounded," 6 June 44—0600 hrs. 1 Aug. 44	1,934	29,283	31,217
Died of Wounds, 6 June 44—0600 hrs. 1 Aug. 44	157	1,623	1,780
	2,091	30,906	32,997

Progress of evacuation to the U.K. as transmitted to A.M.D. 12 was recorded by the medical authorities in charge at the points of disembarkation, a straight count of heads being supported by nominal rolls citing in most cases, a diagnosis. At the start, there was inevitably disparity between the figures, and the June nominal rolls register only 92% of the numbers counted; but in July 99·3% cases were supported by names. If we weight the June figures derived from nominal rolls with due regard to this leakage we get the following:

Personnel Evacuated from Normandy

	Sick	Wounded	Injured Unspec.	No Diagnosis	Total
OFFICERS					
June	132	702	140	64	1,038
July	218	730	129	27	1,104
OTHER RANKS					
June	3,692	9,784	2,171	1,349	16,996
July	6,331	12,182	2,914	1,077	22,504
TOTAL					
June	3,824	10,486	2,311	1,413	18,034
July	6,549	12,912	3,043	1,104	23,608

For reasons stated *Injury Unspecified* in the figures cited above does not necessarily mean *accidentally* injured. It merely records lack of information with respect to the source of the injury. If we assume that the cases for which there is no diagnosis are divided between sick and injured in the same proportions as those for which a diagnosis is cited we get the following budget:

Injured Personnel Evacuated from Normandy

	OFFICERS			OTHER RANKS		
	Wounds	Unspec.	Total	Wounds	Unspec.	Total
1. June, Crude Figures	702	140	842	9,784	2,171	11,955
2. No diagnosis cases, divided proportionately	46	9	55	844	187	1,031
3. TOTAL JUNE	748	149	897	10,628	2,358	12,986
4. July, Crude Figures	730	129	859	12,182	2,914	15,096
5. No diagnosis cases, divided proportionately	18	3	21	612	146	758
6. TOTAL JULY	748	132	880	12,794	3,060	15,854
7. TOTAL 3 and 6	1,496	281	1,777	23,422	5,418	28,840

For two reasons, the above figure (28,840) for total injured O.Rs. evacuated to the U.K. is not exactly comparable with the A.G. (Stats.) figure for wounded, since:

(*a*) it refers to persons arriving in the U.K. up to the end of July, and therefore excludes those wounded at the end of the month but not as yet evacuated:

(*b*) figures for total injuries derived from medical sources and for wounded from 2nd Echelon each contain an unknown proportion of individuals with unspecified injuries.

Fortunately, combination of the data from both sources on the basis of two extreme assumptions yields figures which do not diverge excessively for our present purpose.

	% Evacuated Offrs.	O.Rs.	Total
I. If all injuries unspecified were reported as wounded	85·0	93·3	92·8
II. If no injuries unspecified were reported as wounded	71·6	75·8	75·5

Thus we cannot be far out if we assume that the proportions of officers and O.Rs. evacuated are respectively about 80% and 85%. On this basis we can combine the information supplied by A.F.s W3118 and I1220 without introducing a serious error.

The total figure from the A.M.D. 12 nominal rolls can also be used as a control whereby the completeness of our sample of A.Fs. I1220 can be checked. We find, in fact:

	OFFRS.	O.Rs.	TOTAL
A.F. I1220 sample, supposedly 10%	85	2,034	2,119
A.M.D. 12 Nominal roll of cases evacuated	1,777	28,840	30,617
Actual percentage of A.M.D. 12 figures represented by A.F. I1220 sample	4·8	7·1	6·9

It is believed that the deficiency may be due more to incompleteness of rendition of A.Fs. I1220 than to the known exclusion from our sample of the very long-term cases. Since there is ample evidence that officers do not in fact spend longer in hospital than O.Rs., this supposition is to some extent borne out by greater deficiency among officers.

Relative Importance of Sickness and Battle Injuries

Even in a highly selected army such as that which invaded France in 1944, there is sickness; and the proportion of battle to total casualties differs greatly in different medical units, as disclosed by information derived from A.F. W3118 and from A.M.D. 12 nominal rolls. The ensuing figures are based on the former.

Cases Dealt with Entirely in FORWARD Medical Units

		Injuries* E.A.	Injuries* N.E.A.	Exhaustion and Psychiatric	Sick
Officers	% of total	40·9	10·4	3·0	45·7
	Standard error	2·07	1·28	0·71	2·10
O.Rs.	% of total	23·8	10·9	17·8	47·5
	Standard error	0·49	0·36	0·44	0·57

*In this table, as elsewhere, E.A. = Enemy Action; N.E.A. = NOT Enemy Action.

The next table is based on information supplied by the nominal rolls. No standard errors are given, since the figures are a historical record of a unique event, being complete as such. Thus sampling methods are not applicable, and even if we do elect to regard all battle casualties as a homogeneous universe of which our figures record a sample, it is obviously not random and there is no reason to suppose that samples so defined and so chosen are normally distributed.

Cases Evacuated to Hospital (Percentages)

	Injuries E.A.	Injuries Unspecified	Exhaustion and Psychiatric	Sick
Officers	69·2	13·0	2·3	15·6
Other Ranks	59·5	13·8	8·0	18·8

Comparing the two tables, the character of injury as a relatively more serious contribution to wastage than sickness is clearly seen. To present the differential incidence of the various types of casualties in the two classes of medical units and their respective contributions to the grand total, we have to take into account the limits set by alternative assumptions with respect to allocation of *unspecified* injuries. The table below gives a representative mid-way figure, subject to a *maximum* and *minimum* as indicated by the $\pm$ (or $\mp$) sign. Accordingly, the higher values for those evacuated are always associated with lower values for those treated in forward units. Thus, our estimate of the proportions of different types of casualties admitted to medical units of the same type will lie between closer limits than the ones for persons evacuated or not evacuated. Also, higher values for any category of officers are comparable only with higher values for the similar category of other ranks. This tabulation neglects the sampling error for cases treated in *forward* units as trivial with respect to our present purpose.

Disposal and Nature of All Cases Admitted to Medical Units

		Injuries E.A.	Injuries N.E.A.	Exhaustion and Psychiatric	Sick	Total
Officers	Treated in Forward units	13·05±4·05	3·35±1·05	0·95±0·35	14·6 ±4·5	31·95± 9·95
	Evacuated	47·05∓6·85	8·85∓1·25	1·55∓0·25	10·65∓1·55	68·1 ∓ 9·9
	Total	60·1 ∓2·8	12·2 ∓0·2	2·5 ±0·1	25·25±2·95	100·0
Other Ranks	Treated in Forward units	7·05±3·55	3·2 ±1·6	5·25±2·65	14·0 ±7·0	29·5 ±14·8
	Evacuated	41·85∓8·85	9·75∓2·05	5·6 ∓1·2	13·2 ∓2·8	70·4 ∓14·9
	Total	48·9 ∓5·3	12·95∓0·45	10·85±1·45	27·2 ±4·2	100·0

Evacuation Policy

One further item of information can be extracted from the nominal rolls of A.M.D.12. So soon as airfields had been captured in Normandy, air evacuation of casualties supplemented evacuation by sea. The nominal rolls show the method employed. Tables 156 and 156a give separate figures from this source with due regard to allocation of *No Diagnosis* as above.

The table below shows the emergence of a policy with respect to air and sea evacuation. The ratio of the percentage of all wounded evacuated by air to the percentage of air-evacuated sick can be determined separately for Officers and Other Ranks. The June figures show little variation between the four categories, and such as there is follows no clear system. In July, however, the picture is entirely different. The chances of being evacuated by air were about 1·9 times as great for an injured person as for a sick one, and 1·4 times as great for an Officer as for an Other Rank. It would appear that a policy favouring air-evacuation for injury and, to a less extent, for Officers, was being implemented.

The Growth of Evacuation Policy (Percentages evacuated by air)

	JUNE			JULY		
	(a) Sick	(b) Injured	Ratio (b) ÷ (a)	(a) Sick	(b) Injured	Ratio (b) ÷ (a)
A. OTHER RANKS....	18·0	16·4	0·91	14·7	28·1	1·91
B. OFFICERS	19·3	20·8	1·08	20·9	37·8	1·81
C. Ratio B ÷ A	1·07	1·27		1·42	1·35	

The Relative Distribution of Injuries E.A. and N.E.A.

As shown above, the demarcation between wounds and accidental injuries is not easy to determine. The criterion employed in sorting A.Fs. W3118 and I1220 was whether clinical notes directly recorded information relating injury to employment or an enemy weapon. Thus wounds caused by secondary missiles or burns sustained in a tank set on fire by enemy guns were counted as *E.A.* So were injuries from land mines or booby traps. Men described as injured by falling debris, in default of evidence associating the casualty with explosion of a shell or bomb, were counted as *N.E.A.* Self-inflicted wounds were also counted as *N.E.A.* This is, in fact, a more restricted specification than either:

(*a*) w.r.t. *E.A.* cases, the definition of *wounded* by A.G. (Stats.) on the testimony of the reporting unit, and hence their own interpretation of "accidental injuries sustained in proximity to the enemy";

(*b*) w.r.t. *N.E.A.* cases, the list of *injuries unspecified* in the nominal roll of A.M.D. 12.

It is, however, the only definition easily applicable to the data of this enquiry; and some divergence between estimates based on such different definitions is regrettably inevitable as the following figures indicate:

	Injuries E.A. Crude Figures	%	*Injuries N.E.A.* Crude Figures	%
A.F. I1220 Sample	1,899	89·6	220	10·4
A.M.D. 12 Nominal Rolls	24,918	81·4	5,699	18·6

To some extent conclusions relating to division of casualties as *E.A.* and *N.E.A.* are thus limited by the arbitrary definitions necessarily adopted. In so far as they depend on a more precise definition, figures based on A.F. I1220 give us a clearer picture than those based on nominal rolls of A.M.D. 12, but it must be borne in mind that any subdivision into E.A. and N.E.A. in the analysis which follows has to be interpreted with due regard to the definition of N.E.A. implied. In Tables 157-161 as in other sections, the term N.C.O. has been interpreted to include L/Cpl. and its equivalent.

The salient conclusions that emerge therefrom are:

(*a*) as one would expect, the ratio between injuries E.A. and N.E.A. varies considerably between ranks and arms of the Service (Tables 157, 160);

(*b*) a greater proportion of the injured dealt with in forward areas and not evacuated, in contradistinction to those evacuated, were N.E.A. This preponderance is accounted for almost exclusively by cases returned to duty. Very few of the injured N.E.A. die. (Tables 157, 159);

(*c*) of cases dealt with in forward areas without being evacuated, about half returned to duty and about half died. About two-thirds are E.A. and one-third N.E.A. (Table 158);

(*d*) although nearly a third of such injuries are, in fact, Infantrymen (Table 160); injuries N.E.A. are relatively *least* common among the infantry;

(*e*) we can, of course, get no fresh estimate of the proportions evacuated and not evacuated from samples of A.Fs. W3118 and I1220 selected as these were. Indeed, application of the method discussed on page 187 breaks down in this respect, as a result of the wide margin of error assignable to the ratio of injuries N.E.A. to E.A. among cases treated in forward areas. Such a calculation does however give us a better delineation of the *overall* proportion of injuries that were N.E.A. within the scope of the definition adopted above. This is found to be 14·5 ± 2·5% (Table 161.)

TABLE 156

Evacuation From Normandy; June-July 1944

OFFICERS					O.Rs.				
	Sick	Injured	Total Cases			Sick	Injured	Total Cases	
JUNE					JUNE				
Sea	13·71	86·29	100·0	824	Sea	23·24	76·76	100·0	14,146
Air	12·62	87·38	100·0	214	Air	25·30	74·70	100·0	2,850
Total	13·49	86·51	100·0	1,038	Total	23·58	76·42	100·0	16,996
JULY					JULY				
Sea	24·55	75·45	100·0	725	Sea	33·42	66·58	100·0	17,080
Air	12·40	87·60	100·0	379	Air	18·12	81·88	100·0	5,424
Total	20·38	79·62	100·0	1,104	Total	29·73	70·27	100·0	22,504
TOTAL					TOTAL				
Sea	18·79	81·21	100·0	1,549	Sea	28·81	71·20	100·0	31,226
Air	12·48	87·52	100·0	593	Air	20·59	79·41	100·0	8,274
Total	17·04	82·96	100·0	2,142	Total	27·09	72·91	100·0	39,500

TABLE 156a

		OFFICERS		OTHER RANKS	
		Sick	Injured	Sick	Injured
JUNE	Sea	80·7	79·2	82·0	83·6
	Air	19·3	20·8	18·0	16·4
	Total	100·0	100·0	100·0	100·0
JULY	Sea	79·1	62·2	85·3	71·9
	Air	20·9	37·8	14·7	28·1
	Total	100·0	100·0	100·0	100·0

TABLE 157

Ratio of Casualties E.A. and N.E.A. by Rank (Numbers in brackets give crude figures in samples)

A.

(i) NOT EVACUATED	OFFICERS	N.C.O.	PTE.	TOTAL CASES	
E.A.	8·6	24·4	67·0	100·0	(1,848)
N.E.A.	5·9	24·1	70·0	100·0	(888)
TOTAL	7·7	24·3	68·0	100·0	(2,736)
(ii) EVACUATED					
E.A.	4·2	25·0	70·8	100·0	(1,899)
N.E.A.	2·3	22·7	75·0	100·0	(220)
TOTAL	4·0	24·8	71·2	100·0	(2,119)

B.

(i) NOT EVACUATED	OFFICERS	N.C.O.	PTE.	TOTAL CASES
E.A.	75·4	67·8	66·6	67·5
N.E.A.	24·6	32·2	33·4	32·5
TOTAL	100·0 (211)	100·0 (665)	100·0 (1,860)	100·0 (2,736)
(ii) EVACUATED				
E.A.	94·1	90·5	89·1	89·6
N.E.A.	5·9	9·5	10·9	10·4
TOTAL	100·0 (85)	100·0 (525)	100·0 (1,509)	100·0 (2,119)

TABLE 158

Disposal and Nature of Casualties Not Evacuated Beyond Forward Medical Units

ALL RANKS	E.A.	N.E.A.	TOTAL
Returned to duty	27·1	31·2	58·3
Died	40·5	1·3	41·8
TOTAL (2,736)	67·6	32·5	100·0

TABLE 159 **Distribution of Casualties Not Evacuated by Rank**

	A. (i) RETURNED TO DUTY					B. (i) RETURNED TO DUTY			
	OFFRS.	N.C.O.	PTE.	TOTAL CASES		OFFRS.	N.C.O.	PTE.	TOTAL CASES
E.A.	10·0	25·2	64·8	100·0 (741)	E.A.	61·7	47·0	44·6	46·5
N.E.A.	5·4	24·7	69·9	100·0 (853)	N.E.A.	38·3	53·0	55·4	53·5
TOTAL	7·5	25·0	67·5	100·0 (1,594)	TOTAL	100·0 (120)	100·0 (398)	100·0 (1,076)	100·0 (1,594)
	(ii) DIED					(ii) DIED			
E.A.	7·7	23·8	68·5	100·0 (1,107)	E.A.	93·4	98·9	96·7	96·9
N.E.A.	17·1	8·6	74·2	100·0 (35)*	N.E.A.	6·6	1·1	3·3	3·1
TOTAL	8·0	23·4	68·7	100·0 (1,142)	TOTAL	100·0 (91)	100·0 (267)	100·0 (784)	100·0 (1,142)

TABLE 160 **Distribution of Casualties by Arm of Service**

	A					(i) NOT EVACUATED	B					
	Armd.	Arty.	Inf.	Fwd. Services	Others	Total Cases	Armd.	Arty.	Inf.	Fwd. Services	Others	Total Cases
E.A.	7·8	12·3	67·4	6·8	5·7	100·0 (1,848)	74·6	62·5	81·9	43·6	28·7	67·6
N.E.A.	5·5	15·5	31·1	18·3	29·5	100·0 (888)	25·4	37·5	18·1	56·4	71·3	32·4
TOTAL	7·1	13·4	55·7	10·5	13·4	100·0 (2,736)	100·0 (193)	100·0 (365)	100·0 (1,521)	100·0 (287)	100·0 (370)	100·0 (2,736)
						(ii) EVACUATED						
E.A.	7·3	8·7	72·8	5·9	5·3	100·0 (1,899)	87·4	82·9	94·1	74·2	71·4	89·6
N.E.A.	9·1	15·5	39·5	17·7	18·2	100·0 (220)	12·6	17·1	5·9	25·8	28·6	10·4
TOTAL	7·5	9·4	69·4	7·1	6·6	100·0 (2,119)	100·0 (159)	100·0 (199)	100·0 (1,470)	100·0 (151)	100·0 (140)	100·0 (2,119)

TABLE 161 **Limits of Overall Disposal and Nature of Casualties**

	DIED	RETURNED TO DUTY	EVACUATED	TOTAL
E.A.	7·55 ± 4·63	5·05 ± 3·10	72·90 ∓ 10·25	85·5 ∓ 2·51
N.E.A.	0·24 ± 0·15	5·79 ± 3·55	8·47 ∓ 1·18	14·5 ± 2·51
TOTAL	7·79 ± 4·78	10·84 ± 6·65	81·37 ∓ 11·43	100·0

*Based on a small number of cases.

Downgrading as a Measure of Wastage

TWO criteria of the *gravity* of injuries as a source of wastage are available:

(i) resulting number of days off duty;

(ii) physical deterioration as indicated by downgrading or invaliding.

This section is concerned to show how the two are associated. For this purpose "days off duty" signifies the number of days that elapse between injury and final disposal by discharge from hospital, by death or by appearance before a Medical Board for discharge from the Army (Category E). It therefore covers time spent in all medical units including Convalescent Depots, but excludes sick leave, outpatient attendance, or stay in hospital after invaliding. Though A.F. I1220 specifically calls for the patient's medical category on admission and discharge, failure to give such information is unfortunately common. In consequence it is necessary to limit enquiry with reference to downgrading to cases shown as Category C or E on discharge. These are known to have been downgraded, since only men in Categories A and B landed in France during the period covered. Relevant data are incomplete in two ways:

(*a*) some cards do not state medical category on discharge;

(*b*) the proportion of our sample in E is far below reasonable expectation in the light of other estimates, and hence suspect.

Almost certainly these two deficiencies are not, as might at first be supposed, mutually explanatory. All cards not citing medical category on discharge were carefully examined; and no case recorded thereon had as yet come before a board at the time when the documents were dispatched. Hence figures here presented have been separately calculated on each of two assumptions with respect to unspecified cases:

Assumption I: No case of category unspecified was in fact downgraded;

Assumption II: We know nothing about them, and should therefore neglect them.

Tables 162 and 163 are designed to show the increasing proportion of patients downgraded among groups spending longer periods away from duty. As for compilation of other tables given below, the basis of sample classification is a *decile* split w.r.t. date of discharge from medical units, i.e. division of the whole sample, after arrangement in order of precedence with respect to day of discharge, into groups composed of a number of individuals approximately equivalent to one-tenth of the total. Thus the first decile is composed of 10% of the sample and is made up of individuals all of whom obtained discharge before any of the residual 90%. The second decile, also composed of 10% of the sample, is made up of individuals all of whom obtained discharge after those in the first decile and before those in the deciles including the residual 80%.

Table 162 shows separately for E.A. and N.E.A. in accordance with each Assumption I and II above, the proportions downgraded *within* each tenth of the sample split as above, with the corresponding date of discharge from hospital of the last man in a given sample tenth. The salient feature is a progressive increase of downgradings in successive sample-tenths, *i.e.* increasing proportion of downgrading associated with longer duration of stay. The N.E.A. sample is too small to justify acceptance at its face value of what appears to be less severe deterioration. Since the sample is defective w.r.t. some who spent 7-10 months and all who spent a longer time in hospital, the very high downgrading rate in the terminal sample-tenths furnishes an acceptable explanation of the absolute deficiency w.r.t. E category personnel as mentioned above.

Table 163 shows the proportionate contribution of each sample-tenth to the total downgraded. It is notable that:

(i) over 40% of E.A. downgradings occurred in the terminal tenth (remaining between 142 and 292 days)

(ii) downgradings in the first 5 tenths (remaining less than 55 days) were trivial.

Table 164 shows separately for E.A. and N.E.A., in accordance with Assumptions I and II above, the proportions downgraded within each Arm of Service group, as delimited in §1. What emerges is that the chances of downgrading, if wounded or injured, do not materially differ with different Arms of Service. Analogous remarks apply *mutatis mutandis* to proportions downgraded in the three categories of rank (Table 165).

Man-Day Wastage

From the standpoint of man-power planning we have at our disposal four criteria of wastage: (*a*) death; (*b*) invaliding; (*c*) downgrading; (*d*) days off duty. Available data w.r.t. (*b*) and (*c*) have been set forth above. What follows refers to (*a*) and (*d*). It will be convenient to consider separately the data respectively derived wholly from A.F. W3118 (*not* evacuated to the U.K.) and those taken from A.F. I1220 (evacuated).

(i) **Deaths and Cases Returned to Unit (R.T.U.) in the theatre.** The A.F. I1220 sample survey disclosed *no* case of death in a U.K. hospital. Hence the proportion of such deaths appears to have been negligible from a statistical viewpoint. Table 166 thus shows that:

(*a*) over 50% of deaths in *all* medical units occurred on the day of admission;

(*b*) over 80% of the deaths occurred in the first three days;

(*c*) under 5% of deaths occurred later than one week after admission.

Table 167 refers only to survivors discharged from medical units without evacuation. The figures therefore indicate what the evacuation policy was. The salient conclusions are:

(*a*) nearly a quarter of such admissions remained only a day for treatment;

(*b*) over a half remained for a period less than 4 days;

(*c*) less than one-fifth remained longer than a week.

(ii) **Cases evacuated to the U.K.** Since the tables above exhibit a decile classification w.r.t. days to disposal, little remains to be said about man-day wastage among evacuated cases. Table 168 exhibits the same data in another way, showing:

(*a*) over 20% remained not more than one month;

(*b*) over 70% remained not more than three months;

(*c*) about 15% still remained at the end of four months.

Accompanying charts illustrate some features not stressed in the text above. Chart 35 shows the decile classification w.r.t. days to disposal referred to in the tables accompanying this section. It emphasizes the fairly constant proportion of injuries N.E.A. and E.A. in each sample tenth, and also embodies, in the lower half of the chart, the data of Table 168. The two histograms at the bottom of the page compare rates of disposal of E.A. and N.E.A. injuries in accordance with our standard conventions viz.: that part of the histogram which is *common* to both E.A. and N.E.A. is in solid black while excess of E.A. and of N.E.A. is represented by stippling and diagonal shading respectively. Chart 36, which refers to casualties not evacuated to U.K., embodies the data of Tables 166-167, exhibited separately for injuries E.A. and N.E.A.

Time Spent at Different Stages of Evacuation

Time-off-duty is amenable to a threefold split:

(*a*) time *to* Hospital, *i.e.* the period between injury and arrival at a hospital *in the U.K.* Since all but a few cases first received medical attention on the day of injury this coincides with time spent in forward units;

(*b*) time *in* Hospital;

(*c*) time in Convalescent Depots.

The last two, (*b*) and (*c*), are self-explanatory except in so far as the latter refers solely to Military Convalescent Depots, *i.e.* B.R.C.S. or Order of St. John Auxiliary Hospitals and Convalescent Homes were counted as Hospitals.

In assessing relative distribution of time-off-duty between the three stages of treatment, we are concerned solely with man-day wastage. The unit taken is loss to the Army of the services of one man for one day or, what comes to the same thing, the occupation of a bed in a medical unit for one day.* The distribution of man-days off duty as between the three stages of treatment for each of the ten severity grades specified by the decile split described above is given in Table 169 and shows:

(*a*) that 22% of total time lost to duty by all the men in the sample was spent in Convalescent Depots;

(*b*) that the last 10% of the men to return to duty or to be invalided from the service accounted for 25% of the total time lost.

Not every case goes to a Convalescent Depot. Table 170 shows the percentage of each of the successive 10% groups who in fact did so. While 50% of all cases go to Convalescent Depot, the frequency of such treatment increases with length of stay in hospital. Since officers seldom go to Military Convalescent Depots, the percentages shown in this table are a trifle lower than they should be.

For comparison of time spent at the relevant stages of medical treatment, Table 169 gives us an over-all picture, as affecting any group of evacuated wounded. In so far as we are concerned with how far the period in Convalescent Depot is related to length of stay in hospital, we are interested solely in the sub-group of the cases of Table 170. Table 171 which refers to the same sample shows the mean periods spent at each stage by each of the ten severity ranks, i.e. for calculating mean period in Convalescent Depot only those who actually went there are taken into account. Had the extent of direct disposal from hospital been anticipated at the start, it would have been preferable to relate the mean period in Convalescent Depot of cases despatched thereto to the mean period of hospitalization of the same personnel, i.e. to exclude cases not so disposed of for the computation of the mean hospitalization period. Any distortion arising from their inclusion does not greatly affect the main conclusions which emerge from Table 171, viz.:

(*a*) in the first 6 groups the time spent in Convalescent Depot was about one-third of the period in hospital;

(*b*) for the next three groups it rises, so that men off duty between 85 and 142 days spent in Convalescent Depot a period more than half as long as in hospital;

(*c*) for the final decile the relative time spent in Convalescent Depot drops again, possibly in part because of the incompleteness of the sample and in part due to administrative procedure prompted by the higher proportion of downgradings and invalidings therein.

* Strictly speaking, of course, cases invalided from the Army should not be assessed in this way. For the sake of simplicity, we have to consider them in terms of man-day wastage from injury to medical boarding.

Tables 172, 173 and 174, respectively, show the percentage of men evacuated for each day after wounding, the percentage discharged from hospital for each month after admission, and the percentage discharged from Convalescent Depot for each week after admission. These tables show the *bed-state position* for a fixed intake at each of the three stages. To interpret them aright two considerations are important:

(i) these figures present the rate at which casualties would have been discharged if they had all entered hospital at the same time; and their use for bed-state planning pre-supposes due regard to the rate of admission;

(ii) since there is a high association (see Table 171) between time spent at different levels, it is not legitimate to treat the information of Tables 172, 173 and 174 cumulatively. The use of different time units in these tables is intentional with a view to emphasizing this.

The main conclusions that emerge from this analysis are:

(i) The first 50% of wounded to return to duty account for only 22% of the man-days lost, and the last 10% account for 25%. Since we have already seen that the final decile includes 60% of the cases subsequently invalided from the Army, it accounts for a very high concentration of all wastage.

(ii) Of this total man-day wastage 95% was accommodated in the U.K.—in hospitals 73% and in Military Convalescent Depots 22%. Roughly speaking, one bed in a Convalescent Depot was occupied for one day on account of injury for every 3 days a bed was so occupied in hospital. Needless to say, this does *not* necessarily mean that the hospital population was three times the Convalescent Depot population of wounded at a given time.

(iii) Almost exactly 50% of all injured attended a Convalescent Depot; and the proportion of injured who went to one increased with length of stay in hospital, but not more than 80% of the highest severity grade go there.

(iv) Time spent in Convalescent Depot increased with time spent in hospital.

(v) Time from wounding to arrival in hospital was remarkably low, since 90% were in U.K. hospitals within a week of wounding.

(vi) Of injured, 70% spent under two months in hospital and 97% under six months. Of cases going to Convalescent Depot 50% spent over one month there.

The data of Tables 169-174 are shown graphically in Charts 37 and 38.

It is necessary to emphasize that we have to rely on more or less arbitrary, if plausible, assumptions to co-ordinate the data supplied by different documentary sources with a view to an overall estimate of wastage, such as the foregoing survey of the first 8 weeks of the Normandy Campaign sets forth. With due regard to the limitations inherent in such assumptions and also to the exclusion of exceptionally long-term cases from the hospital sample on which this analysis relies, the *broad* general picture which emerges is the following rough and ready balance sheet, in which the most dubious figure refers to invalidings. In view of the known sources of leakage and of the long time lag frequently involved before invaliding, the true rate is almost certainly very much higher than the 5% cited.

§2 (*contd.*) INJURY AND MAN-POWER WASTAGE—NORMANDY; JUNE—JULY 1944

Approximate Disposal of 1,000 Cases Admitted to All Medical Units; 21 Army Group; June—July 1944

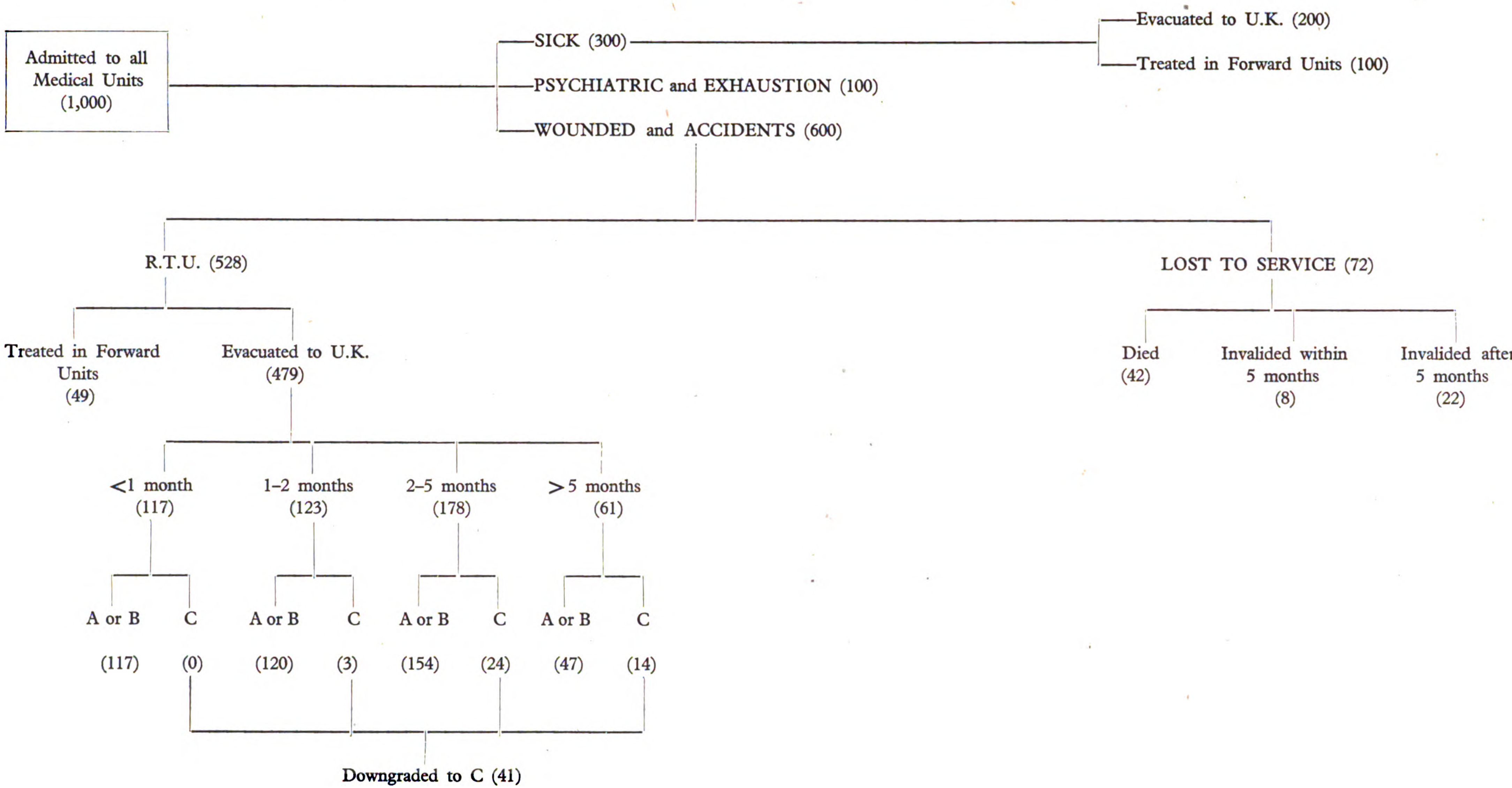

TABLE 162

Relationship Between "Days to Disposal" and Downgrading

(a) E.A. (Assumption I) — (b) E.A. (Assumption II)

Decile	Days to Disposal	(a) C	(a) E	(a) C + E	(a) OTHERS	(a) TOTAL	(b) C	(b) E	(b) C + E	(b) OTHERS	(b) TOTAL
1.	17				100·0	100·0				100·0	100·0
2.	25	1·0		1·0	99·0	100·0	3·0		3·0	97·0	100·0
3.	34				100·0	100·0				100·0	100·0
4.	43	0·5		0·5	99·5	100·0	0·9		0·9	99·1	100·0
5.	55	3·8	0·5	4·3	95·7	100·0	5·8	0·8	6·6	93·4	100·0
6.	67	1·6	2·2	3·8	96·2	100·0	2·2	2·9	5·1	94·9	100·0
7.	84	7·9	2·1	10·0	90·0	100·0	9·7	2·6	12·3	87·9	100·0
8.	111	9·9	3·1	13·0	87·0	100·0	12·8	4·0	16·8	83·2	100·0
9.	142	19·5	3·2	22·7	77·4	100·0	21·5	3·5	25·0	75·0	100·0
10.	292	25·1	14·8	39·9	60·2	100·0	27·2	16·0	43·1	56·8	100·0
TOTAL		6·9	2·5	9·4	90·6	100·0	10·8	4·0	14·7	85·3	100·0

(a) N.E.A. (Assumption I) — (b) N.E.A. (Assumption II)

Decile	Days to Disposal	(a) C	(a) E	(a) C + E	(a) OTHERS	(a) TOTAL	(b) C	(b) E	(b) C + E	(b) OTHERS	(b) TOTAL
1.	17				100·0	100·0				100·0	100·0
2.	25				100·0	100·0				100·0	100·0
3.	34				100·0	100·0				100·0	100·0
4.	43	6·3		6·3	93·7	100·0	7·1		7·1	92·9	100·0
5.	55				100·0	100·0				100·0	100·0
6.	67	4·2		4·2	95·8	100·0	5·0		5·0	95·0	100·0
7.	84	12·5		12·5	87·5	100·0	17·7		17·7	82·4	100·0
8.	111	8·7	4·4	13·1	87·0	100·0	9·5	4·8	14·3	85·7	100·0
9.	142	9·1		9·1	90·9	100·0	9·1		9·1	90·9	100·0
10.	292	16·7		16·7	83·3	100·0	25·0		25·0	75·0	100·0
TOTAL		5·0	0·5	5·5	94·4	100·0	7·9	0·7	8·6	91·4	100·0

TABLE 163

Distribution of Category C and E Cases by "Days to Disposal"

E.A.					N.E.A.		
Decile	Days to Disposal	C	E	C + E	C	E	C + E
1.	17	—	—	—	—	—	—
2.	25	1·5	—	1·1	—	—	—
3.	34	—	—	—	—	—	—
4.	43	0·7	—	0·6	9·1	—	8·3
5.	55	5·4	2·1	4·5	—	—	—
6.	67	2·3	8·3	3·9	9·1	—	8·3
7.	84	11·5	8·3	10·7	27·3	—	25·0
8.	111	14·6	12·5	14·0	18·2	100·0	25·0
9.	142	28·5	12·5	24·2	18·2	—	16·7
10.	292	35·4	56·3	41·0	18·2	—	16·7
TOTAL		100·0	100·0	100·0	100·0	100·0	100·0

TABLE 164

Downgrading by Arm of Service

	(a) E.A. (Assumption I)					(b) E.A. (Assumption II)				
	C	E	C + E	OTHERS	TOTAL	C	E	C + E	OTHERS	TOTAL
ARMOURED	7·0	3·5	10·5	89·5	100·0	11·1	5·6	16·7	83·3	100·0
ARTILLERY	8·6	3·1	11·7	88·3	100·0	13·7	5·0	18·7	81·2	100·0
INFANTRY	6·7	2·3	9·0	91·0	100·0	10·5	3·6	14·1	85·9	100·0
FWD. SERVICES	7·1	1·8	8·9	91·0	100·0	12·5	3·1	15·6	84·4	100·0
OTHERS	5·0	4·0	9·0	91·0	100·0	7·1	5·7	12·8	87·1	100·0
ALL ARMS	6·9	2·5	9·4	90·6	100·0	10·8	4·0	14·8	85·3	100·0
	(a) N.E.A. (Assumption I)					(b) N.E.A. (Assumption II)				
	C	E	C + E	OTHERS	TOTAL	C	E	C + E	OTHERS	TOTAL
ARMOURED	5·0		5·0	95·0	100·0	5·3		5·3	94·7	100·0
ARTILLERY				100·0	100·0				100·0	100·0
INFANTRY	4·6	1·2	5·8	94·3	100·0	7·1	1·8	8·9	91·1	100·0
FWD. SERVICES	7·7		7·7	92·3	100·0	15·0		15·0	85·0	100·0
OTHERS	7·5		7·5	92·5	100·0	12·0		12·0	88·0	100·0

TABLE 165

Downgrading by Rank

(a) E.A. (Assumption I)						(b) E.A. (Assumption II)				
	C	E	C + E	OTHERS	TOTAL	C	E	C + E	OTHERS	TOTAL
OFFICERS	5·0	1·3	6·3	93·8	100·0	12·1	3·0	15·2	84·8	100·0
N.C.Os.	8·6	3·4	12·0	88·0	100·0	13·1	5·1	18·2	81·8	100·0
PTES.....	6·3	2·3	8·6	91·4	100·0	9·9	3·6	13·5	86·6	100·0
(a) N.E.A. (Assumption I)						**(b) N.E.A. (Assumption II)**				
	C	E	C + E	OTHERS	TOTAL	C	E	C + E	OTHERS	TOTAL
OFFICERS				100·0	100·0					100·0
N.C.Os.	10·0	2·0	12·0	88·0	100·0	14·3	2·9	17·1	82·9	100·0
PTES.....	3·6		3·6	96·3	100·0	5·9		5·9	94·1	100·0

TABLE 166

Deaths in Forward Medical Units

(a) E.A.					(b) N.E.A.			
DAYS TO DEATH	OFFICERS	N.C.Os.	PTES.	TOTAL	OFFICERS	N.C.Os.	PTES.	TOTAL
0 — 1	56·8	56·1	50·5	52·3	42·9	66·7	69·0	64·1
1 — 2	21·1	25·0	26·6	25·8	14·3	33·3	6·9	10·3
2 — 3	6·3	8·1	9·4	8·9	—	—	6·9	5·1
3 — 4	7·4	4·4	4·1	4·4	42·9	—	3·4	10·3
4 — 5	2·1	2·4	1·4	1·7	—	—	6·9	5·1
5 — 6	2·1	1·4	1·6	1·6	—	—	—	—
6 — 7	1·1	0·3	1·5	1·2	—	—	3·4	2·6
7 and over	3·2	2·4	4·9	4·2	—	—	3·4	2·6
TOTAL	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 167

Days off Duty in Forward Medical Units

	(a) E.A.				(b) N.E.A.			
DAYS OFF DUTY	OFFICERS	N.C.Os.	PTES.	TOTAL	OFFICERS	N.C.Os.	PTES.	TOTAL
1.	20·9	26·6	20·6	22·1	21·6	22·1	24·9	24·1
2.	12·2	13·9	15·2	14·6	11·8	17·3	13·8	14·6
3.	13·9	14·3	15·4	15·0	9·8	14·4	14·3	14·1
4.	13·9	9·8	12·7	12·2	17·6	13·7	10·5	11·6
5.	7·8	9·0	9·5	9·2	2·0	10·3	9·0	9·0
6.	2·6	8·6	5·0	5·6	11·8	3·7	6·7	6·2
7.	3·5	5·3	4·1	4·3	5·9	4·1	4·8	4·6
7+	25·2	12·3	17·4	17·1	19·6	14·4	16·0	15·8
TOTAL	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

TABLE 168

Percentage Disposed per 4-week Month.—Cases Evacuated to the U.K.

	(a) Month by Month		(b) Cumulative	
Month	E.A.	N.E.A.	E.A.	N.E.A.
1	24·6	28·2	24·6	28·2
2	26·5	24·1	51·1	52·3
3	19·1	21·8	70·2	74·1
4	10·7	12·3	80·9	86·4
5	8·4	7·3	89·3	93·7
6	4·8	2·3	94·1	96·0
7	2·6	0·5	96·7	96·5
8	1·7	1·4	98·4	97·9
9	0·9	0·9	99·3	98·8
10	0·5	1·4	99·8	100·0
11	0·2	0·0	100·0	100·0
	100·0 (1,899)	100·0 (220)	(1,899)	(220)

TABLE 169 **Percentage of Total Man-Day Wastage in Each Decile Group and at Each Stage of Treatment**

	GROUP										TOTAL
	1	2	3	4	5	6	7	8	9	10	
Man-days to Hospital	0·4	0·5	0·5	0·5	0·5	0·5	0·5	0·6	0·7	0·7	5·3
Man-days *in* Hospital	1·5	2·8	3·5	4·5	5·6	6·6	8·0	9·5	11·7	19·3	73·1
Man-days in Convalescent Depot	0·04	0·1	0·3	0·5	0·9	1·7	2·5	4·2	5·9	5·3	21·6
Total Man-day Wastage	1·9	3·4	4·3	5·5	7·0	8·8	11·0	14·3	18·3	25·3	100·0 (145,555)
TOTAL by 1st and 2nd 50%	22·1					77·7					

TABLE 170 **Percentage of Cases in Each Group (including Officers) who Attended Convalescent Depot**

	GROUP									
	1	2	3	4	5	6	7	8	9	10
Percentage attending Convalescent Depot	8·0	14·4	21·9	42·3	47·8	67·9	64·3	74·9	80·7	76·4

TABLE 171 **Mean Days for Each Group at Different Medical Levels**

	GROUP									
	1	2	3	4	5	6	7	8	9	10
1. Days to Hospital	2·8	3·4	3·6	3·9	3·9	3·9	4·4	4·5	5·7	5·4
2. Days *in* Hospital	9·8	17·9	24·3	31·6	39·5	46·2	55·0	64·4	80·1	144·3
3. Days in Convalescent Depot	3·7	5·9	8·4	9·0	13·4	17·6	26·2	38·0	50·3	51·9
4. 3 ÷ 2	0·38	0·33	0·35	0·28	0·34	0·38	0·48	0·59	0·63	0·39

TABLE 172 **Percentage Evacuated (a) Per day after wounding; (b) Per day after wounding—Cumulative**

	DAYS														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14+
(a) Percentage Transferred to Hospital per day	1·2	8·5	25·6	24·6	13·8	8·6	5·5	2·8	1·6	1·5	1·3	0·7	1·0	0·6	2·7
(b) Percentage Transferred to Hospital per day—Cumulative	1·2	9·7	35·3	59·9	73·7	82·3	87·8	90·6	92·2	93·7	95·0	95·7	96·7	97·3	100·0 (1889)

TABLE 173 **Percentage Discharged from Hospital (a) Per 4 weeks after admission; (b) Per 4 weeks—Cumulative**

	MONTHS									
	1	2	3	4	5	6	7	8	9	10
(a) Percentage Discharged from Hospital per 4 weeks	35·7	32·8	17·2	6·2	3·5	1·8	1·1	1·0	0·5	0·1
(b) Percentage Discharged from Hospital per 4 weeks—Cumulative	35·7	68·5	85·7	91·9	95·4	97·2	98·3	99·3	99·8	99·9 (2119)

TABLE 174 **Percentage Discharged from Convalescent Depot (a) Per week after admission; (b) Per week—Cumulative**

	WEEKS													
	1	2	3	4	5	6	7	8	9	10	11	12	13	13+
(a) Percentage Discharged from Conv. Depot per week....	22·9	11·1	9·4	9·8	9·6	7·5	9·7	7·5	5·1	2·9	1·6	0·9	0·9	1·1
(b) Percentage Discharged from Conv. Depot per week—Cumulative....	22·9	34·0	43·4	53·2	62·8	70·3	80·0	87·5	92·6	95·5	97·1	98·0	98·9	100·0

IN this section there is no separation of injuries N.E.A. from injuries E.A.; and the nature of the data excludes the possibility of any but a gross classification of wounds by anatomical site. Casualties with more than one wound are here defined as *multiple*, without regard to the severity of the several components. The split w.r.t. single injuries is fourfold : (*a*) *Head and Neck*, (*b*) *Arms*, (*c*) *Trunk*, and (*d*) *Legs*. Arms are delimited to include the shoulder girdle, and legs to include flesh of the buttocks. Any involvement of the pelvic contents is assigned to *trunk*.

The data of this section refer to 2,293 cases documented exclusively on A.F.W3118 and 2,111 evacuated to hospital in the U.K. Of the former, 1,042 returned to duty from forward medical units and 1,251 died. Of those evacuated to hospital, and recorded as such on A.Fs. I1220, none died. Evacuated cases assigned to the 10 severity grades were consolidated in two classes, respectively composed of the first and the last five groups, i.e. one class of the *first* 50% to leave hospital and one of the *last* 50%. The casualties recorded on A.F. W3118 also give us two broad divisions, *trivial* and *lethal*. Altogether, we thus have four grades of severity :

(*a*) *trivial i.e.* treated in, and returned to duty from, forward units ;

(*b*) *medium i.e.* evacuated to U.K. hospitals and discharged therefrom among the first 50% ;

(*c*) *severe i.e.* evacuated to U.K. hospitals and discharged among the second 50%.

(*d*) *lethal i.e.* those who died of wounds after receiving some medical attention.

We have already seen (Section 2) that 50% of the last named group died on the day they were first admitted to a medical unit. To a large extent, it therefore refers to cases so severely wounded as to be past medical aid though able to survive some hours after injury. Needless to say, our fourfold classification gives no indication of the distribution of *all* battle casualties, since data w.r.t. instantaneously fatal cases are not here included.

With due regard to the last qualification, Table 175 shows the percentage distribution of injuries at different sites in these four severity grades. To get an overall picture of relative frequency and severity of wounds at individual sites—subject to the same qualification—it is necessary to know the distribution of *all* injuries between the four severity grades chosen. As shown in a previous instalment of this analysis, it is not possible to give *precise* figures ; but it is clearly of the order : 10% *trivial*, 10% *died* and 80% *evacuated*. Tables 176 and 177 have therefore been prepared on the assumption that the overall distribution is : Trivial 10% ; Medium and severe 80% ; Lethal 10%. *See* also the upper right-hand figure of Chart 38. With respect to *hospitalized* cases, some additional information is available. For medium and severe groups separately Table 178 therefore shows the distribution of all hospitalized casualties by the *number* of wounds received.

Table 179 shows distribution of wounds by site separately for each arm of service. Tables 180 and 181 show the results of an attempt to classify evacuated injuries by type as well as by site. The original intention to make a more detailed analysis of the data on A.Fs. I1220 with reference to types of wound failed owing to inadequacy of the clinical notes. However, it has been possible to make a sort based on five broad categories. Of these, (*a*) *concussion* and (*b*) *burns* are self explanatory. The other three are : (*c*) *superficial*, (*d*) *flesh*, (*e*) *bone*, the last including *any* involvement of bone whatsoever. Demarcation between superficial and flesh wounds is largely referable to the judgment of the investigators. Unfortunately, it has been possible to classify this information only for single injuries. So the figures are representative only on the assumption that the distribution for multiple wounds is comparable. Table 180 shows the overall distribution of types of wound and Table 181 shows their distribution for each of the four major anatomical sites. The main conclusions that stand out from these tables are :

(i) head and neck wounds are less likely to cause long term hospitalization although relatively important as a cause of death ;

(ii) trunk injuries are about as common as head and neck wounds ; but make by far the largest contribution to death from wounds ;

(iii) under 1% of arm wounds prove fatal ;

(iv) nearly two thirds of long-term hospital cases are either leg injuries or multiple wounds ; but there are relatively more slight leg injuries and more lethal multiple injuries ;

(v) nearly 30% of casualties evacuated as a result of injury are due to multiple wounds, over half of which have only two wounds. About 5% of all injured receive more than four wounds. Seemingly, multiple injuries spend longer in hospital than single wounds ;

(vi) with one notable exception, there is little difference with reference to distribution of wounds by site among the different arms of the service. Among troops serving with armour about 40% of hospitalized wounded as opposed to under 30% for other arms have multiple injuries ;

(vii) among single wounds about 15% involve bone injury ; and such injury greatly increases liability to long term hospitalization ;

(viii) among single injuries bone injuries of the arm are relatively commoner than of the leg ;

(ix) burns, which account for under 3% of single injuries, are most common on the arm.

TABLE 175

Distribution of Injuries (E.A. and N.E.A.) by Site

	Trivial	Medium	Severe	Lethal
Head and Neck	27·3	12·9	6·6	16·7
Arms	20·4	26·2	19·6	1·9
Trunk	15·8	7·6	9·2	38·5
Legs	26·9	26·9	32·4	14·9
Multiple	9·6	26·4	32·3	27·9
	100 (1,042)	100 (1,074)	100 (1,037)	100 (1,251)

TABLE 176

Relative Severity of Injuries (E.A. and N.E.A.) at Different Sites

	Trivial	Medium	Severe	Lethal	Total
Head and Neck	22·4	42·3	21·6	13·7	100
Arms	9·9	51·0	38·2	0·9	100
Trunk	13·0	25·0	30·3	31·7	100
Legs	9·6	38·6	46·5	5·3	100
Multiple	3·5	38·8	47·4	10·2	100

TABLE 177

Overall Distribution of all Injuries by Site

Head and Neck	12·2
Arms	20·6
Trunk	12·2
Legs	27·9
Multiple	27·2
TOTAL	100

TABLE 178

Distribution of Hospitalized Injuries (E.A. and N.E.A.) by Number of Wounds

Number of Wounds	Medium	Severe	Total
1	73·7	67·9	70·8
2	17·4	18·6	18·0
3	4·1	6·0	5·1
4	0·7	1·7	1·1
over 4	4·1	6·0	5·1
TOTAL	100	100	100

TABLE 179

Distribution of Hospitalized Injuries by Site and Arm of Service

Site	Armoured	Artillery	Infantry	Forward Services	Others
Head and Neck	6·9	11·2	9·9	12·7	6·3
Arms	19·4	22·3	23·0	22·7	26·4
Trunk	6·9	9·6	8·5	8·7	6·9
Legs	26·3	29·9	30·0	26·0	33·3
Multiple	40·6	26·9	28·6	30·0	27·1
TOTAL	100 (160)	100 (197)	100 (1,465)	100 (150)	100 (144)

TABLE 180

Distribution of Injuries by Type and Severity (single injuries only)

	Medium	Severe	All Hospitalized
Superficial	10·1	4·9	7·6
Flesh	79·9	68·4	74·4
Bone	5·4	24·7	14·7
Concussion	0·4	0·6	0·5
Burns	4·1	1·2	2·7
TOTAL	100 (701)	100 (651)	100 (1,352)

TABLE 181

Distribution of Hospitalized Single Injuries by Type and Site

	Head and Neck	Arms	Trunk	Legs
Superficial	10·4	7·0	10·7	5·3
Flesh	70·9	68·1	86·7	78·9
Bone	12·6	20·4	2·7	14·5
Concussion	2·7	—	—	—
Burns	3·3	4·5	—	1·3
TOTAL	100 (182)	100 (445)	100 (150)	100 (545)

§4 WEAPONS AND WOUNDS—NORMANDY; JUNE–JULY 1944

ATTEMPTS to assess relative efficacy of weapons from clinical records of injuries they cause call for caution. At best, they rest on the soldier's impression of what hit him, sometimes supplemented by a surgeon's estimate of its plausibility checked by the nature of the wound and of any foreign body removed. Often the soldier in modern battle does not know what wounded him, and a civilian surgeon of an E.M.S. hospital is not necessarily an expert on missile identification. Nevertheless, clinical records do attempt to specify the causal weapon in the majority of cases; and since such information is sparse we can at best present a picture of what *appear to be* the effects of different weapons from such data as are available on the understanding that what follows be accepted with reserve. The main issues involving *known* bias are:

(*a*) Gunshot wound (G.S.W.) may be referred indiscriminately to a wound caused by any weapon, a hangover from the practice of 1914-18. Fortunately, a more specific definition of the weapon is often in the notes. So far as is possible from such indications we here use the term to cover *small arms* wounds.

(*b*) Differential diagnosis of *shell* and *mortar* wounds is inevitably crude, since mortar wounds are sometimes described as shell, though the reverse rarely, if ever, happens. So we cannot be certain that *mortar* or *shell* here refers to a random sample of wounds so specified.

(*c*) Statements about enemy weapons are likely to be most reliable if made nearest the place and time of their use. When there were discrepancies between notes made at different stages of treatment, we have therefore relied where possible on information in A.F. W3118.

(*d*) As with respect to sites of injury, we have *no* information regarding what weapons cause *instantaneous* death.

Ensuing tables conform to patterns discussed earlier. Table 182 and Chart 38 show distribution of wounds caused by different weapons among four severity grades. For *Trivial*, *Evacuated* and *Lethal* wounds Table 183 shows separately the distribution of wounds caused by the major weapons *vis-a-vis* anatomical site. Table 184 shows the proportion of men with 1, 2, 3 . . . wounds caused by different weapons. Proportions downgraded after wounding by individual weapons are in Table 185. Distributions of wounds caused by different weapons in the various arms of the service and as between Officers, N.C.Os., and Privates are in Tables 186-189.

The main conclusions which emerge are as follows:

(i) About 90% of all wounds are due to shells, mortar bombs and gunshot in about equal proportions. There is no dramatic difference with reference to relative severity of wounds caused by different weapons; except in so far as bomb and gunshot wounds tend to produce a higher proportion of *fatal* injuries.

(ii) With respect to anatomical sites, the main difference between weapons concerns greater or less propensity for inflicting *multiple* wounds. Gunshot wounds of the head and neck and trunk are relatively rare among evacuated injuries and relatively common among lethal ones, a fact probably referable to greater missile velocity.

(iii) Nearly 80% of gunshot wounds are *single* injuries, whereas under 70% of any other type are such. *Pepper-pot* injuries are relatively most common from mines and grenades.

(iv) Assessed by downgrading, *gunshot* wounds appear to cause more permanent damage than other types.

(v) The characteristics of different weapons are clearly reflected in the distribution of wounds by arm of service. Similar proportions of shell, mortar and gunshot wounds in the sample as a whole is largely due to the high proportion of infantry among casualties. Among other arms the proportions are quite different. Whereas about 80% of all mortar casualties are infantrymen only about 50% of mine casualties are such, and it is clear that the mine and the bomb are relatively of more effect among supporting troops. Artillery suffer over 50% of their casualties from shelling. In so far as such differences accord with common sense, they impart confidence in the data.

(vi) Distributions of wounds by weapon are much the same for Officers, N.C.Os., and Privates.

TABLE 182 **Overall Distribution of Wounds by Weapon and Severity Grades**

	Trivial	Medium	Severe	Lethal
Mine	3·7	5·0	3·9	2·5
Bomb	6·9	2·6	3·1	3·5
Shell	48·4	35·6	33·7	35·7
Mortar	19·8	26·8	23·8	13·5
Grenade	1·4	1·2	0·9	0·5
Gunshot	19·4	28·0	34·0	43·9
Bayonet	0·3	0·5	0·1	0·4
Multiple	—	0·4	0·6	—
Total	100 (930)	100 (851)	100 (835)	100 (996)

	Trivial	Medium	Severe	Lethal	Total
Mine	8·9	47·6	37·4	6·0	100
Bomb	20·7	31·4	37·2	10·6	100
Shell	13·4	39·7	36·9	9·9	100
Mortar	8·3	46·1	40·0	5·7	100
Grenade	13·1	47·9	34·8	4·3	100
Gunshot	6·3	36·3	43·3	14·2	100
Bayonet....	—	—	—	—	Negligible
Multiple	—	—	—	—	„

TABLE 183

Distribution of Wounds by Weapon and Site of Injury

	Head and Neck	Arms	Trunk	Legs	Multiple	Total
A—Trivial						
Mine	34·3	20·0	2·9	25·7	17·1	100 (35)
Bomb	21·9	20·3	12·5	26·6	18·8	100 (64)
Shell	28·9	20·7	16·0	25·6	8·9	100 (450)
Mortar	25·5	20·1	19·6	21·7	13·0	100 (184)
Gunshot	23·8	24·9	16·6	30·9	3·8	100 (181)
B—Evacuated						
	Head and Neck	Arms	Trunk	Legs	Multiple	Total
Mine	14·7	6·7	8·0	14·7	56·0	100 (75)
Bomb	14·6	25·0	10·4	12·5	37·5	100 (48)
Shell	10·1	20·8	9·1	27·6	32·3	100 (582)
Mortar	11·8	21·3	9·5	26·5	31·0	100 (423)
Gunshot	6·9	30·8	8·3	32·9	21·2	100 (520)
C—Lethal						
	Head and Neck	Arms	Trunk	Legs	Multiple	Total
Mine	8·0	—	20·0	20·0	52·0	100 (25)
Bomb	5·7	2·9	60·0	8·6	22·9	100 (35)
Shell	16·2	1·8	35·2	17·6	29·1	100 (437)
Mortar	11·9	3·7	31·3	21·6	31·3	100 (134)
Gunshot	17·1	2·0	50·8	9·3	20·8	100 (356)

TABLE 184

Number of Wounds Caused by Different Weapons (Evacuated cases only)

	1	2	3	4	5	5+	Total
Mine	43·9	31·9	8·0	1·3	—	14·7	100 (75)
Bomb	62·4	20·8	6·2	2·1	—	8·3	100 (48)
Shell	67·9	20·0	5·5	0·6	0·6	5·2	100 (583)
Mortar	69·3	20·7	5·9	1·9	—	2·4	100 (426)
Grenade	57·9	10·5	15·8	—	—	15·8	100 (19)
Gunshot	78·6	14·7	6·2	0·5	0·1	—	100 (520)
Bayonet	—	—	—	—	—	—	Negligible
Multiple	—	—	—	—	—	—	Negligible

TABLE 185

Percentage of Personnel Wounded by Individual Weapons Downgraded to Categories C and E

	Assumption I*	Assumption II*
Mine	5·3	10·0
Bomb	6·3	10·7
Shell	8·7	13·7
Mortar	6·8	12·8
Grenade†		
Gunshot	11·5	17·1
Bayonet†		
Multiple†		

* For basis of Assumptions I and II see §2, p. 193

† Insufficient cases.

TABLE 186

Distribution of Trivial Wounds by Weapon and Arm of Service

	Armoured	Artillery	Infantry	Forward	Others	Total
Mine	—	4·4	2·2	16·4	8·8	3·9
Bomb	2·3	14·9	5·2	8·2	14·0	7·1
Shell	64·8	51·8	45·4	43·8	52·5	46·9
Mortar	10·2	15·8	23·4	16·4	8·8	20·4
Grenade	3·4	—	1·3	1·4	1·8	1·4
Gunshot	18·2	13·2	22·0	13·7	14·0	20·1
Bayonet	1·1	—	0·3	—	—	0·3
Multiple	—	—	—	—	—	—
Total	100 (88)	100 (114)	100 (598)	100 (73)	100 (57)	100 (930)
Mine	—	14·3	37·2	34·3	14·3	100 (35)
Bomb	3·1	26·5	48·4	9·4	12·5	100 (64)
Shell	12·7	13·1	60·4	7·1	6·7	100 (450)
Mortar	4·9	9·8	76·0	6·5	2·7	100 (184)
Grenade						Negligible
Gunshot	8·8	8·3	72·9	5·5	4·4	100 (181)
Bayonet						Negligible
Multiple						Negligible

TABLE 187

Distribution of Evacuated Wounds by Weapon and Arm of Service

	Armoured	Artillery	Infantry	Forward	Others	Total
Mine	9·4	0·7	3·3	11·5	12·8	4·4
Bomb	4·7	5·6	1·7	10·4	4·6	2·8
Shell	47·7	54·5	30·7	29·2	47·6	34·6
Mortar	13·1	15·4	28·8	15·6	15·1	25·3
Grenade	1·9	—	1·0	4·2	—	1·1
Gunshot	21·5	22·4	33·6	29·4	18·6	30·8
Bayonet	—	—	0·5	—	—	0·4
Multiple	1·9	1·4	0·3	—	1·2	0·5
Total	100 (107)	100 (143)	100 (1,254)	100 (96)	100 (86)	100 (1,686)
Mine	13·3	1·3	55·9	14·6	14·6	100 (75)
Bomb	10·4	16·6	43·7	20·8	8·3	100 (48)
Shell	8·8	13·4	66·2	4·8	7·0	100 (583)
Mortar	3·3	5·2	85·1	3·5	3·1	100 (426)
Grenade						Negligible
Gunshot	4·4	6·1	80·8	5·4	3·1	100 (520)
Bayonet						Negligible
Multiple						Negligible

TABLE 188

Distribution of Lethal Wounds by Weapon and Arm of Service

	Armoured	Artillery	Infantry	Forward	Others	Total
Mine	1·6	3·1	1·6	7·7	9·3	2·5
Bomb	—	4·7	2·3	9·6	14·8	3·5
Shell	49·9	50·4	42·8	40·3	40·7	43·9
Mortar	6·4	8·7	16·2	9·6	1·9	13·5
Grenade	—	—	0·4	—	3·7	0·5
Gunshot	41·9	33·0	36·5	32·6	29·6	35·7
Bayonet	—	—	—	—	—	—
Multiple	—	—	0·6	—	—	0·4
Total	100 (62)	100 (127)	100 (701)	100 (52)	100 (54)	100 (996)
Mine	4·0	16·0	44·0	16·0	20·0	100 (25)
Bomb	—	17·2	45·8	14·3	22·9	100 (35)
Shell	7·1	14·7	68·5	4·8	5·0	100 (437)
Mortar	3·0	8·2	84·3	3·7	0·7	100 (134)
Grenade						Negligible
Gunshot	7·3	11·8	71·7	4·8	4·8	100 (356)
Bayonet						Negligible
Multiple						Negligible

TABLE 189

Distribution of Wounds by Weapon and Rank

	Trivial			Medium		
	Officers	N.C.Os.	Ptes.	Officers	N.C.Os.	Ptes.
Mine	3·3	5·4	3·3	7·5	4·5	4·9
Bomb	8·5	3·1	7·9	—	3·5	2·5
Shell	49·8	50·0	47·8	40·0	38·3	34·3
Mortar	21·3	17·6	20·2	25·0	21·9	28·5
Grenade	—	2·8	1·1	2·5	2·0	1·0
Gunshot	17·0	21·2	19·3	22·5	29·9	27·5
Bayonet	—	—	0·4	—	—	0·8
Multiple	—	—	—	2·5	—	0·5
Total	100 (101)	100 (216)	100 (613)	100 (40)	100 (201)	100 (610)

	Severe			Lethal		
	Officers	N.C.Os.	Ptes.	Officers	N.C.Os.	Ptes.
Mine	2·9	4·1	4·0	4·2	3·0	2·0
Bomb	2·9	3·2	3·2	5·4	3·8	3·2
Shell	31·4	27·8	35·9	39·3	44·8	43·9
Mortar	34·3	24·6	22·7	11·8	14·1	13·5
Grenade	—	2·7	0·3	—	1·1	0·6
Gunshot	25·7	37·3	33·0	39·3	33·3	36·1
Bayonet	—	—	0·3	—	—	—
Multiple	2·9	0·4	0·5	—	—	0·6
Total	100 (35)	100 (220)	100 (580)	100 (73)	100 (242)	100 (681)

§5 INJURIES E.A. AND N.E.A. IN OVERSEAS THEATRES

Sources

THIS section is a comparative study of injuries to male Other Ranks of the British Army in three campaigns other than Normandy (*vide* above). It has as its objective the provision of information concerning wastage as it bears on the allocation of medical man-power with particular reference to requirements for Special Surgical Units. Classification of site of injury (*e.g.* as *head* and *spinal* in contradistinction to *facio-maxillary*) therefore tallies with the scope of work undertaken by special surgical units rather than with the strictly literal meaning of the anatomical terms employed. The source of material was information recorded on A.F. I1220 w.r.t. injuries in a two months' period in each of 3 campaigns in two different theatres. Its scope concerns the relation of the cause of injury to its type and site and the ultimate disposal of the soldier. Peripheral nerve and vascular injuries appear in the record card as secondary complications not explicit in the diagnostic specification coded for mechanical tabulation, and relevant information in the original documents is too scanty to justify recourse to sampling analysis. The periods chosen cover a battle, viz.:

Theatre	*Date*	*Battle*	*No. in Sample*
M.E.F. I	May-June, 1942	Knightsbridge	2,637
M.E.F. II	October-November, 1942	2nd Alamein	4,859
B.N.A.F....	December 1942-January 1943	Tunisia	2,511

In contrast with disease records, surgical documents are conspicuously deficient w.r.t. detail. Consequently any framework of classification admits of a considerable number of items (N.S.), whose nature is *not* specified or described indefinitely. The site of injury recorded is the principal site only, as shown on A.F. I1220. *Site of Injury*: *Other* here includes a miscellaneous class of vaguely specified injuries to fasciae, tendons and joints, of multiple injuries with no single predominant locus and of sites N.S. *Cause of Injury*: *N.S.* refers to cases not specifically recorded as due to enemy action, and *Disposal*: *N.S.* likewise refers to cases not specifically recorded in one of the other Classes of Disposal.

Limits of Reliability

In a one dimensional set of classes A, B, C....of which U consists of unspecified items which may be assignable to any of the preceding classes A, B, C, etc., we may cite as a *representative* figure for the proportion of items in each of the latter the proportion derived by rejecting all the items of class U, or (what comes to the same thing) distributing them proportionately among the other classes. If we denote this representative or *Indifferent Estimate* as K, and the numbers in the several classes by x_A, x_B, x_C....x_U whose total is t, we have $k_A = x_A \div (t - x_U)$. The *highest* possible value for the proportion of items in class A is given by $h_A = (x_A + x_U) \div t$, and the least by $l_A = x_A \div t$.

For a two-way classification involving A, B, C....U in one dimension and a, b, c....u in the other, it is necessary to draw up a schema such as the following constructed for horizontal summation. The items here denoted x_{uA}, x_{uB}, etc., are unspecified w.r.t. the classes *a*, *b*, etc.

	A	*B*	*C*	*U*	*Total*
a	x_{aA}	x_{aB}	x_{aC}	x_{aU}	t_a
b	x_{bA}	x_{bB}	x_{bC}	x_{bU}	t_b
c					
.					
.					
.					
.					
.					
u	x_{uA}	x_{uB}	x_{uC}	x_{uU}	t_u

When we are dealing with a one-way classification, rejection of all items about which we have *no* knowledge is equivalent to their proportional distribution among the remainder. When the schema is two dimensional (as above) the issue is not so simple. We now have three categories to consider: items about which we have *both* sorts of relevant knowledge, items about which we have *no* relevant knowledge, and items about which we have *some* relevant knowledge. To reject all items about which we lack relevant information is not in general the same as distributing all our defective items in accordance with the distribution of items w.r.t. which we have *complete* information; nor is it generally the same as distributing proportionately among the classes about which our information is complete, those items about which we have knowledge only of one kind or the other. A further complication arises from the fact that any such redistribution of defective information entails a choice between: (*a*) its allocation in accordance with the original distribution of exact information; (*b*) proportionate allocation of defective information in one dimension in accordance with the results of proportionate distribution in the other dimension or *vice versa*. In general, the results of adopting the second course (*b*) will not be the same; and if we do not know how far the class of defective items is a representative sample of the same row or the same column of our classificatory schema, a decision of one out of several ways by which we might arrive at a representative estimate is clearly arbitrary. On the other hand, limiting figures arising from the inclusion or exclusion of *all* incomplete information are not open to doubt. The maximum is given by:

$$h_{aA} = (x_{aA} + x_{aU} + x_{uA} + x_{uU}) \div (t_a + x_{uA} + x_{uU})$$

The minimum is given by:

$$l_{aA} = x_{aA} \div (t_a + t_u - x_{uA})$$

It is convenient to indicate these limits by the *mean limiting value*:

$$\tfrac{1}{2}(h_{aA} + l_{aA}) \mp \tfrac{1}{2}(h_{aA} - l_{aA})$$

The symbol $\mp$ here indicates that the minimum and maximum limits are respectively specified by subtracting from and adding to the figure to the left the one to the right of it.

Injuries E.A. and N.E.A.

Even in periods of active fighting, sickness and accidents contribute a large proportion of total hospital admissions. A previous analysis of the Normandy Campaign sets forth a balance sheet for 1,000 casualties treated in all medical units. Of this number 90 had treatment for accidents not directly due to enemy action, 400 for sickness and exhaustion, 510 for wounds and burns inflicted by the enemy. Though the importance of sickness no longer needs emphasis in connexion with planning medical requirements for a campaign, it is important to bring more sharply into focus the contribution of accidents to injuries as a whole. Like diseases, accidents are in some measure preventable by appropriate administrative action; and a more searching examination of the sources of accidents could presumably point the way to a considerable conservation of man-power. In the Normandy campaign injuries not directly due to enemy action made up 15% of all injuries. In the three campaigns under review they account for 30-55% of the total:

Comparison by Campaign of Cause of Injury

Campaign	*E.A.*	*N.E.A.*	*Limits of Estimate*	*Total*	*No. of Cases*
M.E.F. I	59·2	40·8	∓3·9	100·0	2,637
M.E.F. II	65·4	34·6	∓3·4	100·0	4,859
B.N.A.F.	48·2	51·8	∓3·9	100·0	2,511

It is here pertinent to emphasize that this study deals with hospitalized cases. In the Normandy campaign one seventh of E.A. casualties and one quarter of accidental injuries received treatment in forward units alone. If this experience is typical of the three battles to which the figures above refer, the relative contribution of accidents to surgical casualties as a whole was greater than the figures cited above.

Types of Injury

Such high proportions of accidents among surgical casualties hospitalized during active fighting prompts us to seek indications w.r.t. the gravity of the two major classes of traumatic cases here distinguished as E.A. and N.E.A. It is here important to remember that figures cited apply to *all* injured men admitted to hospital in these theatres, and not only to those actively engaged in battle. We may distinguish three broad categories as fractures, burns and others, the first being important because they entail long duration of treatment, the second because there is reason to regard N.E.A. burns as appreciably preventable by appropriate action.

The following table shows the distribution of these three types of wounds among surgical casualties as a whole. The data exhibited below show that N.E.A. casualties account for about half the total fractures and about three-quarters the total of burns. Since N.E.A. casualties are less than half the total of all casualties, this means that fractures are appreciably more frequent among N.E.A. than among E.A. casualties, and that burns are considerably more common among the former than among the latter.

Comparison by Campaign of Types of Injury

Total Casualties

Campaign	*Fractures*	*Burns*	*Other Injuries*	*Total*	*Cases*
M.E.F. I	22·1	12·7	65·2	100·0	2,637
M.E.F. II	18·4	10·4	71·2	100·0	4,859
B.N.A.F.....	27·7	5·3	66·9	100·0	2,511

Comparison by Campaign of Types of Injury

Proportions NOT due to enemy action

Campaign	*Fractures*	*Burns*	*Other Injuries*	*All Injuries*
M.E.F. I	55·2∓3·6	70·5∓11·3	30·2∓2·6	40·8∓3·9
M.E.F. II	46·5∓1·8	78·4∓10·3	25·1∓2·1	34·6∓3·4
B.N.A.F.....	69·0∓4·0	85·8∓ 9·7	42·0∓3·5	51·8∓3·9

Sites of Injury

Figures in the following table show a remarkable constancy w.r.t. distribution of injuries among different parts of the body in close conformity with the data of the Normandy campaign. The gravity of the contribution of accidental injuries emerges from the treatment of the same data in the next table. Wounds of the head, face and eyes from all causes account for between 12% and 17% of all hospitalized surgical casualties in the three battles. Sites of injury are grouped in the following tables; the items included in each group heading are detailed in Table 191.

Comparison by Campaign of Sites of Injury

Campaign	*Head*	*Facio-Max*	*Eyes*	*Thorax*	*Abdomen, etc.*	*Limbs, etc.*	*Other*	*Total*	*Cases*
M.E.F. I	5·3	4·3	2·2	4·2	2·1	68·7	13·1	100·0	2,637
M.E.F. II	4·9	7·0	2·7	5·2	2·2	67·4	10·6	100·0	4,859
B.N.A.F.....	9·5	5·5	1·6	4·3	2·6	67·2	9·4	100·0	2,511

Comparison by Campaign of Sites of Injury

Proportions NOT due to enemy action

Campaign	*Head*	*Facio-Max*	*Eyes*	*Thorax*	*Abdomen etc.*	*Limbs, etc.*	*Other Sites*
M.E.F. I	64·7∓8·6	53·5∓7·9	50·0±7·6	15·2∓0·9	49·2∓0·9	40·9∓3·5	31·9∓3·5
M.E.F. II	58·5∓7·3	30·9∓2·5	45·3∓1·9	18·7∓4·4	29·8∓2·3	34·9∓2·6	29·7∓2·1
B.N.A.F.....	60·6∓6·1	53·6∓4·7	48·7∓5·1	41·7∓2·3	54·5∓3·8	52·8∓3·8	40·0∓3·0

Disposals

Figures below exhibit two different estimates of disposals as defined above. It is almost certain that the figures shown in the upper half of the table and based on the rejection of all incomplete records are more representative than those below. In terms of disposal, the gravity of E.A. casualties in these three battles was greater than that of accidents, since the proportion of such cases evacuated to the U.K. was undoubtedly higher and mortality also seems to have been somewhat in excess. It is, however, appropriate to add that cases R.T.U. make up over 80% of either class.

Comparison by Campaign of Disposals According to Cause of Injury

(a) Indifferent Estimates

	Enemy Action					*Not Enemy Action.*				
	Duty	*U.K.*	*Died*	*Total*	*Crude Figure*	*Duty*	*U.K.*	*Died*	*Total*	*Crude Figure*
M.E.F. I	89·2	7·9	2·9	100·0	1,230	97·3	1·3	1·4	100·0	927
M.E.F. II	92·5	2·7	4·8	100·0	2,508	97·2	0·4	2·4	100·0	1,480
B.N.A.F.	82·9	16·1	1·0	100·0	898	92·5	6·0	1·5	100·0	1,094

(b) Mean Limiting Values

	Duty	*U.K.*	*Died*	*Duty*	*U.K.*	*Died*
M.E.F. I	82·9∓8·8	14·7∓8·6	10·5∓8·3	94·3∓3·4	4·3∓3·2	4·4∓3·2
M.E.F. II	84·7∓9·4	11·4∓9·2	13·0∓9·3	94·8∓2·4	3·1∓2·8	5·2∓3·1
B.N.A.F.	76·2∓11·8	23·0∓11·7	11·3∓10·6	87·6∓6·4	11·1∓6·2	6·8∓5·6

Table 190 separately shows the same three main categories of disposal for each of the three main types of injury not separated w.r.t. cause of the injury. As before, evacuation to the U.K. here signifies that the casualty was in need of prolonged treatment and rehabilitation, or unfit for further service in the theatre. *Duty* in this context includes disposal from hospital to Convalescent Depot, since the great majority of the latter would be fit for further service. Limits of Error (in italics) refer both to the *Duty* and *U.K.* columns.

Sites of Injury w.r.t. Work of Special Surgical Units

Table 191 sets forth data with respect to disposal and types of injury as they come within the scope of each of the several types of special surgical units. As regards disposal, the figures for the various campaigns are not comparable owing to differences of procedure and documentation.

Contribution of Surgical Casualties to Hospitalized Wastage

With a view to assessing the needs of the Army for surgical specialists it is appropriate to bring together more explicitly in this context data set forth elsewhere. Analysis of the Normandy campaign yielded the following approximate percentages of admissions to *all* medical units:

INJURIES E.A.—51. INJURIES N.E.A.—9.
SICK AND EXHAUSTED—40.

It is safe to assume that the proportion of surgical casualties among those Normandy casualties classified as sick and exhausted was trivial. For U.K. hospitalized casualties this is not so. Figures below show that Hernia, Appendicitis and I.D.K. account for about 6½% of male hospital admissions (R.C.R.) in 1943 and 14% of man-day wastage (R.W.R.) arising therefrom. Altogether somewhat more than 22% of hospital admissions among military personnel in the U.K. in 1943 and about 35% of man-day wastage attributable thereto were surgical casualties, excluding E.N.T. For the same year in the U.K. the subsequent table indicates the Relative Casualty Rates and Relative Wastage Rates for different specialist groups of hospital admissions.

Hospital Cases in the U.K.; 1943

	Military Personnel		*A.T.S.*	
	R.C.R.	*R.W.R.*	*R.C.R.*	*R.W.R.*
Accidents	14·4	20·9	7·1	9·3
Battle Casualties	1·1	1·4	0·0	0·1
Hernia	3·5	7·8	0·3	0·7
Appendicitis	1·7	3·0	5·5	8·2
I.D.K.	1·4	3·2	0·3	0·6
All others	77·9	63·7	86·7	81·2
TOTAL	100·0	100·0	100·0	100·0

Hospital Cases in the U.K.; 1943

	Military		*A.T.S.*	
	R.C.R.	*R.W.R.*	*R.C.R.*	*R.W.R*
Surgical casualties other than E.N.T. and genito-urinary cases	22·1	36·3	13·3	18·9
E.N.T.	8·2	5·3	12·3	9·8
Psychiatric Disorders	5·0	6·6	3·9	5·6
Skin diseases	9·2	6·3	5·0	4·5
Genito-urinary diseases	4·2	3·7	13·4	12·5
Eye diseases	1·4	1·0	0·8	0·8
Others	49·9	40·8	51·3	47·9
TOTAL	100·0	100·0	100·0	100·0

The Importance of Accidents

The relevance of the foregoing survey to the allocation of surgical man-power and requirements w.r.t. special surgical units naturally depends on the nature of the situation. Medical Statistics can indicate what the requirements have been in particular circumstances, e.g. static or otherwise, in an expeditionary force newly disembarked and in a well-established theatre of war, in temperate and in hot climates, etc. It is then for the Administration to draw its own conclusions concerning the bearing of such information on a future operation. Another outcome of this enquiry invites more explicit comment. The very high proportion of surgical casualties not directly attributable to enemy action clearly calls for more information with reference to the origin of accidents and to means of avoiding them. Since any document which can be the basis of disciplinary action is liable to omit relevant information that might be prejudicial to persons concerned in circumstances deemed to merit leniency in the view of the officer responsible for its rendition, a record such as A.F. B117 is not ideal as a source of statistical data for this purpose. A purely medical document suitably designed would be preferable. At present the design of medical documents such as A.Fs. W3118 and I1220 does not provide for any explicit rendition of information relevant to the circumstances to which an accident is attributable; suitable provision for the inclusion of such data therefore calls for consideration when occasion arises for a new issue of field and hospital record cards.

Summary

The main conclusions which emerge from the data of this section are three, *viz.*:

(*a*) Even in battle conditions, a high proportion of the work of Special Surgical Units is concerned with accidental injuries not directly due to enemy action.

(*b*) Since a high proportion of accidental injuries are preventable, more exact information w.r.t. causation could appreciably contribute to conservation of man-power.

(*c*) Availability of such information at regular intervals presupposes a redesign of basic medical documents to provide more information w.r.t. accidents.

TABLE 190

Comparison by Campaign of Disposal According to Type of Injury

Fractures

	Duty		U.K.	Died	Total	No. of Cases
M.E.F. I	79·8	*∓10·9*	18·3	1·9	100·0	583
M.E.F. II	77·9	*∓14·1*	18·3	3·8	100·0	893
B.N.A.F.	71·6	*∓12·1*	26·4	2·0	100·0	696

Burns

	Duty		U.K.	Died	Total	No. of Cases
M.E.F. I	93·8	*∓ 3·0*	3·6	2·7	100·0	336
M.E.F. II	94·4	*∓ 2·1*	2·5	3·2	100·0	505
B.N.A.F.	93·7	*∓ 2·6*	5·6	0·8	100·0	134

Other Injuries

	Duty		U.K.	Died	Total	No. of Cases
M.E.F. I	89·9	*∓ 4·0*	8·3	1·9	100·0	1,718
M.E.F. II	90·5	*∓ 5·0*	6·1	3·4	100·0	3,461
B.N.A.F.	86·9	*∓ 5·1*	12·4	0·7	100·0	1,681

Limits of Error (in italics) refer both to the *Duty* and *U.K.* columns.

TABLE 191

Analysis of Each Site of Injury by (a) Type of Injury and (b) Disposal of Patient

	No. of Cases	TYPE OF INJURY				DISPOSAL					
		Fractures	Burns	Other Injuries	Total	Duty	C.D.	U.K.	Died	N.S.	Total
Head and Spinal Injuries											
M.E.F. I.	139	13·7	—	86·3	100·0	44·6	48·2	2·9	1·4	2·9	100·0
M.E.F. II	240	6·3	—	93·7	100·0	58·3	32·9	—	4·2	4·6	100·0
B.N.A.F.	239	19·3	—	80·7	100·0	64·4	14·6	7·5	3·4	10·0	100·0
Facio-maxillary Injuries											
M.E.F. I.	114	27·2	16·7	56·1	100·0	62·2	34·2	0·9	—	2·7	100·0
M.E.F. II.	342	19·6	17·0	63·4	100·0	53·5	40·0	0·6	0·6	5·3	100·0
B.N.A.F.	137	27·7	16·1	56·2	100·0	78·8	6·6	4·4	—	10·2	100·0
Eye Injuries											
M.E.F. I.	59	—	5·1	94·9	100·0	79·7	18·6	—	—	1·7	100·0
M.E.F. II	126	—	4·8	95·2	100·0	77·0	16·7	—	0·8	5·6	100·0
B.N.A.F.	39	—	7·7	92·3	100·0	66·7	—	20·5	—	12·8	100·0
Thoracic Injuries											
M.E.F. I.	112	7·1	0·9	92·0	100·0	27·7	61·6	0·9	4·5	5·4	100·0
M.E.F. II.	254	11·0	2·4	86·6	100·0	27·6	55·1	0·4	8·3	8·7	100·0
B.N.A.F.	109	17·4	0·9	81·7	100·0	64·2	17·4	6·4	1·8	10·1	100·0
Abdominal, Pelvic, Genito-Urinary and Perineal Injuries											
M.E.F. I.	56	23·2	5·4	71·4	100·0	41·1	25·0	5·4	7·1	21·4	100·0
M.E.F. II.	109	11·0	1·8	87·2	100·0	22·9	37·6	1·8	16·5	21·2	100·0
B.N.A.F.	65	27·7	—	72·3	100·0	49·2	13·9	7·7	6·1	23·1	100·0
Injuries of Limbs, Neck, Back and Buttock											
M.E.F. I.	1,812	27·5	11·3	61·2	100·0	30·9	51·7	5·0	0·7	11·8	100·0
M.E.F. II.	3,263	23·1	10·1	66·8	100·0	36·9	45·9	1·8	1·4	13·9	100·0
B.N.A.F.	1,687	33·7	4·4	61·9	100·0	55·0	20·7	·9·7	0·4	14·2	100·0
Injuries of Tendons, Fasciae, Joints, Multiple Sites and Sites N.S.											
M.E.F. I.	345	3·8	30·7	65·5	100·0	25·8	47·2	5·2	8·7	13·0	100·0
M.E.F. II.	515	3·1	20·0	76·9	100·0	29·5	38·7	2·5	13·2	16·1	100·0
B.N.A.F.	235	2·6	14·5	83·0	100·0	54·0	17·9	8·5	3·0	16·6	100·0

Part IX. PSYCHIATRY IN THE ARMY

§1 PSYCHIATRIC DISORDERS TREATED AS IN-PATIENTS IN THE U.K.

DATA regarding in-patients treated in Military or E.M.S. Psychiatric Hospitals as set forth below come from monthly *proformas* made up by the hospitals and submitted to A.M.D.11 (Directorate of Army Psychiatry). Figures from Military Hospitals refer to three time periods chosen to exhibit trends w.r.t. the source of patients and their prospects as regards further service or return to civil life. The data in Table 192 show the margin of uncertainty arising from partition of cases transferred from overseas and from other hospitals. Some fraction of the latter had seen overseas service. Hence it is legitimate only to set upper and lower limits to the proportions computed. The *minus-plus* sign indicates these limits within which the correct figure lies and the number which follows is *not* a Standard Error. From Tables 192 and 193 and from Chart 39 we see that: (*a*) the proportion of overseas cases increased during the period under survey, especially in 1944 when more ample shipping facilities made evacuation easier from the Mediterranean and India; (*b*) the proportion of men returning to duty also increased. It is highly likely that overseas cases in 1943-1944 were better types of men who therefore made good working recoveries. It is also possible that there was an increasing zeal in military hospitals to restore men to duty after 1942, through the agency of the Annexure Scheme and later through the agency of Convalescent Depots where psychiatric aid in the last stages encouraged psychiatrists in hospitals to send men to such depots. During 1942, psychiatrists would probably have decided to discharge many similar cases to civil life. Table 193 makes it clear that Officers are more frequently returned to duty than are Other Ranks. This may be due to the more urgent need for Officers, to the fact that Officers on the whole possess more varied qualifications which makes replacement easier within the service, and, less certainly, to their greater emotional stability.

Table 195 shows the disposals of military in-patients in E.M.S. hospitals during the years 1943 and 1944. There is a downward trend of the proportion returned to duty either directly or through the Annexure (Employment) Scheme.

TABLE 192

Percentages of Cases Treated in Military Psychiatric Hospitals in U.K. which were Transferred from Overseas; British Army; April 1942—December 1944

(*a*)	Total	Psychosis	Psychoneurosis and Psychopathic Personality
OFFICERS:			
April, 1942—March, 1943	8·5∓1·5	14·0∓3·0	6·0∓1·0
April, 1943—March, 1944	19·5∓2·5	35·0∓5·7	7·0∓0·5
April, 1944—December, 1944	55·7∓4·4	44·0∓7·5	57·0∓5·0
OTHER RANKS:			
April, 1942—March, 1943	6·3∓1·0	15·3∓3·1	3·5∓0·5
April, 1943—March, 1944	24·0∓3·6	34·2∓5·3	20·7∓2·9
April, 1944—December, 1944	58·4∓9·1	50·6∓9·4	59·8∓9·0
(*b*)			
April, 1942—March, 1943:			
Officers	8·5∓1·5	14·0∓3·0	6·0∓1·0
Other Ranks	6·3∓1·0	15·3∓3·1	3·5∓0·5
April, 1943—March, 1944:			
Officers	19·5∓2·5	35·0∓5·7	7·0∓0·5
Other Ranks	24·0∓3·6	34·2∓5·3	20·7∓2·9
April, 1944—December, 1944:			
Officers	55·7∓4·4	44·0∓7·5	57·0∓5·0
Other Ranks	58·4∓9·1	50·6∓9·4	59·8∓9·0

TABLE 193

Relative Disposal on Final Discharge from Military Psychiatric Hospitals in U.K.; British Army; April 1942-December 1944

(a)	TOTAL					PSYCHOSIS				PSYCHONEUROSIS AND PSYCHOPATHIC PERSONALITY			
	Crude Figures	R.T.U.	Civil* Life	Death	Total	R.T.U.	Civil* Life	Death	Total	R.T.U.	Civil* Life	Death	Total
OFFICERS:													
April, 1942-March, 1943	466	48·3	51·3	0·4	100·0	26·6	72·4	1·0	100·0	57·7	42·0	0·3	100·0
April, 1943-March, 1944	508	59·6	40·4	—	100·0	41·4	58·6	—	100·0	73·0	27·0	—	100·0
April, 1944-December, 1944	762	63·3	36·3	0·4	100·0	34·7	64·1	1·2	100·0	71·5	28·3	0·2	100·0
OTHER RANKS:													
April, 1942-March, 1943	7,791	26·1	73·7	0·2	100·0	1·3	98·1	0·6	100·0	34·0	65·9	0·1	100·0
April, 1943-March, 1944	9,374	34·3	65·4	0·3	100·0	3·9	95·1	1·0	100·0	45·2	54·7	0·1	100·0
April, 1944-December, 1944	8,645	41·8	58·0	0·2	100·0	3·6	95·8	0·6	100·0	52·7	47·2	0·1	100·0

(*b*)

April, 1942-March, 1943:													
Officers	466	48·3	51·3	0·4	100·0	26·6	72·4	1·0	100·0	57·7	42·0	0·3	100·0
Other Ranks	7,791	26·1	73·7	0·2	100·0	1·3	98·1	0·6	100·0	34·0	65·9	0·1	100·0
April, 1943-March, 1944:													
Officers	508	59·6	40·4	—	100·0	41·4	58·6	—	100·0	73·0	27·0	—	100·0
Other Ranks	9,374	34·3	65·4	0·3	100·0	3·9	95·1	1·0	100·0	45·2	54·7	0·1	100·0
April, 1944-December, 1944:													
Officers	762	63·3	36·3	0·4	100·0	34·7	64·1	1·2	100·0	71·5	28·3	0·2	100·0
Other Ranks	8,645	41·8	58·0	0·2	100·0	3·6	95·8	0·6	100·0	52·7	47·2	0·1	100·0

* To Civil Employment, Care of Relatives or Civil Mental Hospitals.

TABLE 194 Relative Disposal of Cases Discharged to Civil Life from Military Psychiatric Hospitals in U.K.; British Army; April 1942—December 1944

	To Civil Employment		To Care of Relatives		To Civil Mental Hospital	
(*a*)	All Psychiatric Cases	Psychoses Only	All Psychiatric Cases	Psychoses Only	All Psychiatric Cases	Psychoses Only
OFFICERS: April, 1942-March, 1943	77·8	79·6	20·9	17·5	1·3	2·9
April, 1943-March, 1944	93·2	90·5	5·8	7·9	1·0	1·6
April, 1944-December, 1944	93·1	82·6	5·8	14·7	1·1	2·7
OTHER RANKS: April, 1942-March, 1943	72·6	36·1	24·9	55·9	2·5	8·0
April, 1943-March, 1944	73·5	37·1	20·7	47·8	5·8	15·1
April, 1944-December, 1944	77·8	41·4	19·3	50·6	2·9	8·0
(*b*)						
April, 1942-March, 1943: Officers	77·8	79·6	20·9	17·5	1·3	2·9
Other Ranks	72·6	36·1	24·9	55·9	2·5	8·0
April, 1943-March, 1944: Officers	93·2	90·5	5·8	7·9	1·0	1·6
Other Ranks	73·5	37·1	20·7	47·8	5·8	15·1
April, 1944-December, 1944: Officers	93·1	82·6	5·8	14·7	1·1	2·7
Other Ranks	77·8	41·4	19·3	50·6	2·9	8·0

TABLE 195

Psychiatric Disposals from Hospitals of the E.M.S.; Military and A.T.S.; January 1943—December 1944

Period	R.T.U. and Annexure	Discharge Category E	Deaths and Discharge as Absent	Total	Total (Crude Figures)
1. Jan.—April, 1943	42·8	56·9	0·2	100·0	2,688
2. July—Dec., 1943	34·8	64·9	0·1	100·0	4,411
3. Jan.—June, 1944	25·9	73·6	0·4	100·0	4,603
4. July—Dec., 1944	28·8	70·8	0·3	100·0	2,807

§2 PSYCHIATRIC DISORDERS TREATED AS OUT-PATIENTS IN THE U.K.

THE data of Tables 196-199 come from returns submitted to A.M.D.11 on standard *proformas* relating to all military and A.T.S. personnel seen as OUT-PATIENTS by Psychiatrists at command and area centres, excluding G.S. intakes. Their object is to disclose trends w.r.t. conditions seen by Army Psychiatrists over a period of two years at six-monthly intervals. Tables 196 (a) and (b) are arranged for comparison of male and female personnel over these periods. So also is Table 197. Table 198 contrasts disposals by diagnosis over the four periods. Table 199 shows changes in the distribution of cases sent to different types of hospital and exhibits the tendency for male psychoneurotics to go increasingly to military rather than to E.M.S. Hospitals owing to a large contemporary increase of beds for psychiatric cases in the former. The reverse is true of A.T.S. It appears from Table 197 and Chart 41 that the proportion of cases requiring *no attention* by Psychiatrists decreased slightly during the two years dealt with. There was an increase of the proportion of psychoneurotics seen in out-patient departments (Table 196 and Chart 40) and a sharp reduction of the number of mental defectives, indicative of the efficacy of personnel selection. Table 197 shows that this is naturally associated with a reduction of the number of men transferred to the Pioneer Corps. Contemporaneously, there was a rise of the percentage of those whose categories were lowered and of recommendations for discharge following a War Office letter of December, 1943. The A.T.S. figures also show a drop of the proportion of mental defectives, but the smaller number is probably due to the early elimination of women recruits of lowest intelligence grading (S.G.5).

TABLE 196 **Psychiatric Out-Patients in the U.K.; Analysis by Diagnosis (Percentages of Total Examined); British Army; 1943 and 1944**

(a)	Psychoneurosis	Mental Defect	Psychosis	Other Diagnoses	Total	Cases Examined (Crude Figures)
MILITARY: 1943 1st Half	57·0	29·0	2·9	11·1	100·0	36,374
2nd Half	60·4	25·6	2·6	11·4	100·0	36,857
1944 1st Half	70·9	16·7	2·4	10·0	100·0	37,074
2nd Half	78·5	10·9	2·2	8·4	100·0	29,446
A.T.S.: 1943 1st Half	73·9	6·6	3·2	16·3	100·0	2,111
2nd Half	78·7	3·3	3·0	15·0	100·0	2,385
1944 1st Half	81·0	1·7	3·8	13·5	100·0	2,499
2nd Half	82·6	2·0	2·2	13·2	100·0	2,476
(b)						
1943 1st Half: Military	57·0	29·0	2·9	11·1	100·0	36,374
A.T.S.	73·9	6·6	3·2	16·3	100·0	2,111
1943 2nd Half: Military	60·4	25·6	2·6	11·4	100·0	36,857
A.T.S.	78·7	3·3	3·0	15·0	100·0	2,385
1944 1st Half: Military	70·9	16·7	2·4	10·0	100·0	37,074
A.T.S.	81·0	1·7	3·8	13·5	100·0	2,499
1944 2nd Half: Military	78·5	10·9	2·2	8·4	100·0	29,446
A.T.S.	82·6	2·0	2·2	13·2	100·0	2,476

TABLE 197 **Psychiatric Out-Patients in the U.K.; Analysis by Recommended Disposal (Percentages of Total Examined); British Army; 1943 and 1944**

	NO ACTION		CHANGE OF EMPLOYMENT AND CATEGORY			WASTAGE, TEMPORARY AND PERMANENT		OTHER DISPOSALS	TOTAL•	Cases Examined (Crude Figures)
	No Treatment	Out-Patient Observation	Change of Employment	Transfer to Pioneer Corps	Reduction of Category	To Hospital	Discharged from the Army			
MILITARY: 1943 1st Half	21·0	10·0	10·8	19·7	8·5	18·3	7·1	4·6	100·0	36,374
2nd Half	21·0	10·8	11·0	15·0	8·0	18·0	9·1	7·1	100·0	36,857
1944 1st Half	19·1	10·8	12·1	9·0	13·5	14·4	15·4	5·7	100·0	37,074
2nd Half	15·7	11·8	12·9	5·6	15·2	17·2	16·2	5·4	100·0	29,446
A.T.S.: 1943 1st Half	22·4	18·5	6·9	—	1·7	18·6	25·1	6·8	100·0	2,111
2nd Half	20·3	20·5	7·4	—	1·6	17·6	25·5	7·0	100·0	2,385
1944 1st Half	18·3	20·4	5·8	—	3·2	16·2	28·4	7·7	100·0	2,499
2nd Half	18·0	17·4	5·6	—	5·1	16·9	27·7	9·3	100·0	2,476

TABLE 198

Psychiatric Out-Patients in the U.K.; Recommended Disposal according to Diagnosis (Percentages of Each Diagnosis); Military Personnel; 1943 and 1944

(a)			NO ACTION	CHANGE OF EMPLOYMENT AND CATEGORY			WASTAGE, TEMPORARY AND PERMANENT		OTHER DISPOSALS	TOTAL	Cases Examined (Crude Figures)
				Change of Employment	Transfer to Pioneer Corps	Reduction of Category	To Hospital	Discharged from the Army			
PSYCHONEUROSIS:	1943	1st Half	27·9	16·1	0·9	14·5	26·8	10·6	3·2	100·0	20,719
		2nd Half	26·8	17·0	0·2	13·1	25·2	13·0	4·7	100·0	22,254
	1944	1st Half	24·6	16·4	0·1	19·0	16·8	19·4	3·7	100·0	26,259
		2nd Half	22·3	16·0	0·2	19·3	19·0	18·7	4·5	100·0	23,118
MENTAL DEFECT:	1943	1st Half	25·3	2·8	65·5	0·4	0·5	3·2	2·3	100·0	10,561
		2nd Half	31·7	2·1	58·1	0·2	0·4	4·5	3·0	100·0	9,412
	1944	1st Half	30·6	2·0	53·7	0·6	0·5	9·2	3·4	100·0	6,173
		2nd Half	32·9	2·3	49·6	0·5	0·5	12·4	1·8	100·0	3,199
PSYCHOSIS:	1943	1st Half	1·7	0·5	0·1	0·7	92·3	2·7	2·0	100·0	1,050
		2nd Half	0·2	0·2	—	0·2	96·6	2·3	0·5	100·0	972
	1944	1st Half	0·7	1·3	—	0·1	94·9	2·8	0·2	100·0	918
		2nd Half	1·5	—	—	—	96·2	1·4	0·9	100·0	661
OTHER DIAGNOSES:	1943	1st Half	69·3	6·9	1·1	0·9	2·4	1·2	18·2	100·0	4,044
		2nd Half	65·4	1·8	0·1	0·1	1·0	0·7	30·9	100·0	4,219
	1944	1st Half	72·5	1·5	0·2	—	0·8	0·6	24·4	100·0	3,724
		2nd Half	76·6	1·5	0·2	0·1	1·0	1·1	19·5	100·0	2,468
TOTAL:	1943	1st Half	31·0	10·8	19·7	8·5	18·3	7·1	4·6	100·0	36,374
		2nd Half	31·8	11·0	15·0	8·0	18·0	9·1	7·1	100·0	36,857
	1944	1st Half	29·9	12·1	9·0	13·5	14·4	15·4	5·7	100·0	37,074
		2nd Half	27·5	12·9	5·6	15·2	17·2	16·2	5·4	100·0	29,446

TABLE 198 (*contd.*)

Psychiatric Out-Patients in the U.K.; Recommended Disposal according to Diagnosis (Percentages of Each Diagnosis); Military Personnel; 1943 and 1944

(b)		NO ACTION	CHANGE OF EMPLOYMENT AND CATEGORY			WASTAGE, TEMPORARY AND PERMANENT		OTHER DISPOSALS	TOTAL	Cases Examined (Crude Figures)
			Change of Employment	Transfer to Pioneer Corps	Reduction of Category	To Hospital	Discharged from the Army			
1943 1st Half:	Psychoneurosis	27·9	16·1	0·9	14·5	26·8	10·6	3·2	100·0	20,719
	Mental Defect.	25·3	2·8	65·5	0·4	0·5	3·2	2·3	100·0	10,561
	Psychosis	1·7	0·5	0·1	0·7	92·3	2·7	2·0	100·0	1,050
	Other Diagnoses	69·3	6·9	1·1	0·9	2·4	1·2	18·2	100·0	4,044
	Total	31·0	10·8	19·7	8·5	18·3	7·1	4·6	100·0	36,374
1943 2nd Half:	Psychoneurosis	26·8	17·0	0·2	13·1	25·2	13·0	4·7	100·0	22,254
	Mental Defect.	31·7	2·1	58·1	0·2	0·4	4·5	3·0	100·0	9,412
	Psychosis	0·2	0·2	—	0·2	96·6	2·3	0·5	100·0	972
	Other Diagnoses	65·4	1·8	0·1	0·1	1·0	0·7	30·9	100·0	4,219
	Total	31·8	11·0	15·0	8·0	18·0	9·1	7·1	100·0	36,857
1944 1st Half:	Psychoneurosis	24·6	16·4	0·1	19·0	16·8	19·4	3·7	100·0	26,259
	Mental Defect.	30·6	2·0	53·7	0·6	0·5	9·2	3·4	100·0	6,173
	Psychosis	0·7	1·3	—	0·1	94·9	2·8	0·2	100·0	918
	Other Diagnoses	72·5	1·5	0·2	—	0·8	0·6	24·4	100·0	3,724
	Total	29·9	12·1	9·0	13·5	14·4	15·4	5·7	100·0	37,074
1944 2nd Half:	Psychoneurosis	22·3	16·0	0·2	19·3	19·0	18·7	4·5	100·0	23,118
	Mental Defect.	32·9	2·3	49·6	0·5	0·5	12·4	1·8	100·0	3,199
	Psychosis	1·5	—	—	—	96·2	1·4	0·9	100·0	661
	Other Diagnoses	76·6	1·5	0·2	0·1	1·0	1·1	19·5	100·0	2,468
	Total	27·5	12·9	5·6	15·2	17·2	16·2	5·4	100·0	29,446

TABLE 199

Psychiatric Out-Patients in the U.K.; Analysis of Cases sent to Hospital (as Percentages of all Psychiatric Cases sent to Hospital); British Army; 1943 and 1944

(a)	E.M.S. Hospitals	Military Neurosis Centres	Military Mental Hospitals	Other Hospitals	Total	Total sent to Hospital (Crude Figures)
MILITARY 1943 1st Half	45·8	30·0	21·0	3·2	100·0	6,672
2nd Half	48·8	30·8	17·8	2·6	100·0	6,636
1944 1st Half	45·8	32·5	20·1	1·6	100·0	5,350
2nd Half	36·7	44·0	17·0	2·3	100·0	5,069
A.T.S. 1943 1st Half	68·1	7·3	15·5	9·1	100·0	393
2nd Half	74·7	3·1	19·1	3·1	100·0	420
1944 1st Half	82·9	4·0	12·6	0·5	100·0	405
2nd Half	82·1	4·0	13·0	0·9	100·0	418
(b)						
1943 1st Half: Military	45·8	30·0	21·0	3·2	100·0	6,672
A.T.S.	68·1	7·3	15·5	9·1	100·0	393
1943 2nd Half: Military	48·8	30·8	17·8	2·6	100·0	6,636
A.T.S.	74·7	3·1	19·1	3·1	100·0	420
1944 1st Half: Military	45·8	32·5	20·1	1·6	100·0	5,350
A.T.S.	82·9	4·0	12·6	0·5	100·0	405
1944 2nd Half: Military	36·7	44·0	17·0	2·3	100·0	5,069
A.T.S.	82·1	4·0	13·0	0·9	100·0	418

§3 PSYCHIATRIC RECOMMENDATIONS w.r.t. DISPOSAL OF INTAKES AND DISPOSAL AT ARMY SELECTION CENTRES

FOR the preparation of Tables 200-203, based on consolidated monthly returns submitted to A.M.D.11 with respect to Army *Intakes*, certain disposal groups are amalgamated to bring into sharper relief the salient features of the procedure adopted, more especially with due regard to the provisional nature of the judgment involved. The classification adopted for Army Selection Centres (Tables 204-206) is more detailed, because decision at this level probably has greater finality.

Table 200 shows the distribution of intelligence grades among intakes over the two years 1943-1944. Selection grade S.G.1 represents the highest level of intelligence. Such differences as exist in the modes of the four periods may be due to different regional and/or industrial source of recruits. Table 201 draws attention to the fact that the overwhelming majority of recruits are not referred for psychiatric interview. There is a steady level of recommendations for each category of disposal. At this level of psychiatric inspection, recommendations with respect to special employment, reduction of category and posting to Pioneers, outweigh recommendations with respect to hospitalization or discharge from the Service.

Table 202 relates the intelligence distribution of Intakes to disposal, showing the absolute proportions in these groups. Since the proportions of the selection grades among Intakes as a whole (Table 200) are not identical, the corresponding proportions in Table 202 do not reflect the relative liabilities of the several selection grades to a given type of disposal. The liabilities of the different selection grades to one and the same type of disposal are proportional to the quotients of corresponding figures in Tables 202 and 200. Table 203 and Chart 42 exhibit these quotients reduced to the same (percentage) scale. The main points which emerge therefrom are:

(*a*) recruits of low intelligence are most likely to be referred for psychiatric inspection, as indeed instructions prescribe w.r.t. the lowest *selection grade* (S.G.5);

(*b*) recommendation for special employment is more likely to occur in those of lower intelligence;

(*c*) in accordance with official policy, relative liability of S.G.5 recruits to be posted to Pioneer Corps in 1944 was twenty times greater than for any other S.G. category;

(*d*) the variation with respect to relative liability to hospitalization and discharge from the Army is of little significance since it is based on a small number of recruits;

(*e*) the above trends persist with little modification over the four periods, and where differences show up they may well be due to differences with respect to the intake populations.

Army Selection Centres (A.S.Cs.) were instituted for the re-allocation and re-employment of men found unsuitable for their existing roles, in accordance with A.C.I. 393 of 1943. Tables 204-206 and Chart 43 refer to psychiatric recommendations at such Centres including recommendations w.r.t. cases (Divisional Intakes) dealt with by the 45th Division which fulfilled a similar function. Figures are computed on the same basis as Table 203 to exhibit relative liability of individuals in each S.G. to a given disposal. An analysis of data corresponding to those cited with respect to intakes in Table 201 revealed that among both 21st Army Group (21 A.G.) troops and other personnel at A.S.Cs. only approximately 50% were seen by a psychiatrist.

Tables 204 and 205 which refer to service personnel in A.S.C. (and 45th Division) at two different periods show:

(i) no noteworthy difference with respect to liability to *Change of Employment*;

(ii) greater relative liability to recategorization of high S.Gs. in the earlier period;

(iii) somewhat lower relative liability in the later period of middle S.Gs. to be sent to Pioneers, in accordance with instructions issued to psychiatrists.

Table 206 (21 Army Group) embraces two periods, one before and one after July, 1944. Before then no battle-worn soldiers appear for inspection with a view to re-allocation. The outstanding difference between disposals of 21 A.G. and other military personnel is that the relative liability of S.G. 5 personnel in 21 A.G. to be placed in the *Seen but No Action* group was low as compared with other S.G. 5 service personnel.

TABLE 200

Distribution of S.Gs. as Percentages of Total Intake; Military Personnel; 1943 and 1944

Period	S.G.1.	S.G.2.	S.G.3+	S.G.3.—	S.G.4.	S.G.5.	Total	Size of Intake
1. January—June 1943	10·2	23·1	23·5	21·3	17·1	4·8	100·0	147000
2. July—December 1943	11·0	18·6	20·5	20·5	20·9	8·6	100·0	63901
3. January—June 1944	7·3	12·5	19·5	25·2	26·9	8·5	100·0	92693
4. July—December 1944	12·0	17·3	21·5	22·3	20·7	6·1	100·0	118493

TABLE 201

Distribution of Psychiatric Recommendations as Percentages of Total Intake; Military Personnel; 1943 and 1944

Period	NOT SEEN OR NO ACTION RECOM-MENDED	SPECIAL EMPLOYMENT AND CHANGE OF CATEGORY			WASTAGE, TEMPORARY AND PERMANENT		TOTAL	Size of Intake
		Combatant Tendency (C.T.) Grading without Special Employment	To Pioneer Corps	Special Employment and Reduction of Category	To Hospital	Discharged from Army		
1. Jan.—June 1943	91·4	3·2	3·4	2·0	0·04	0·05	100·0	147000
2. July—Dec. 1943	89·9	3·8	4·2	1·8	0·05	0·12	100·0	63901
3. Jan.—June 1944	90·7	3·5	4·1	1·5	0·03	0·17	100·0	92693
4. July—Dec. 1944	92·1	3·3	3·1	1·4	0·01	0·09	100·0	118493

TABLE 202

Selection Grades as Percentages of Recommendations; Military Intakes; 1943 and 1944

Disposal	Period	S.G.1.	S.G.2.	S.G.3.+	S.G.3.—	S.G.4.	S.G.5.	Total	Crude Figures
Not Seen or No Action Recommended	1. Jan.—June 1943	10·9	24·5	24·6	21·8	16·0	2·2	100·0	134316
	2. July—Dec. 1943	11·9	19·9	21·8	21·5	20·7	4·2	100·0	57460
	3. Jan.—June 1944	7·7	13·3	20·7	26·8	27·3	4·2	100·0	84046
	4. July—Dec. 1944	12·6	18·2	22·6	23·2	20·5	2·9	100·0	109179
Combatant Tendency Grading without Special Employment	1. Jan.—June 1943	4·4	12·7	16·3	21·0	25·1	20·5	100·0	4687
	2. July—Dec. 1943	6·2	9·7	11·7	16·0	25·8	30·6	100·0	2465
	3. Jan.—June 1944	5·1	8·4	11·7	17·2	31·5	26·1	100·0	3218
	4. July—Dec. 1944	7·6	10·1	13·7	16·4	29·7	22·5	100·0	3936
To Pioneer Corps	1. Jan.—June 1943	0·0	0·2	1·0	5·0	35·1	58·7	100·0	4928
	2. July—Dec. 1943	—	0·1	0·2	1·0	17·9	80·8	100·0	2714
	3. Jan.—June 1944	—	—	0·1	0·6	14·0	85·3	100·0	3818
	4. July—Dec. 1944	0·0	—	0·0	0·4	15·8	83·7	100·0	3647
Special Employment and Reduction of Category	1. Jan.—June 1943	5·9	17·1	22·6	25·1	21·8	7·5	100·0	2940
	2. July—Dec. 1943	6·7	15·1	17·9	24·5	26·7	9·1	100·0	1150
	3. Jan.—June 1944	5·7	10·2	18·8	21·4	31·3	12·6	100·0	1423
	4. July—Dec. 1944	9·0	12·9	19·0	25·0	28·5	5·6	100·0	1609
To Hospital	1. Jan.—June 1943	3·3	13·3	15·0	33·3	23·4	11·7	100·0	60
	2. July—Dec. 1943	5·9	8·9	29·4	17·6	23·5	14·7	100·0	34
	3. Jan.—June 1944	10·7	14·3	7·1	21·4	28·6	17·9	100·0	28
	4. July—Dec. 1944	11·8	11·8	11·8	35·3	17·5	11·8	100·0	17
Discharged from Army	1. Jan.—June 1943	—	7·2	10·1	11·6	39·2	31·9	100·0	69
	2. July—Dec. 1943	—	10·3	10·3	10·3	17·9	51·2	100·0	78
	3. Jan.—June 1944	0·6	5·6	7·5	7·5	22·5	56·3	100·0	160
	4. July—Dec. 1944	1·9	3·8	7·6	18·1	19·1	49·5	100·0	150

TABLE 203

Relative Liability of Intakes of Different Selection Grades to Specified Disposal in Accordance with Psychiatrists' Recommendations; Military Personnel; 1943 and 1944

Disposal	Period	S.G.1.	S.G.2.	S.G.3.+	S.G.3.—	S.G.4.	S.G.5.	Total
Not Seen or No Action Recommended	1. Jan.—June 1943	19·11	18·97	18·72	18·29	16·73	8·19	100·0
	2. July—Dec. 1943	18·84	18·65	18·52	18·28	17·25	8·50	100·0
	3. Jan.—June 1944	18·34	18·50	18·47	18·49	17·65	8·60	100·0
	4. July—Dec. 1944	18·56	18·60	18·59	18·39	17·50	8·40	100·0
Combatant Tendency (C.T.) Grading without Special Employment	1. Jan.—June 1943	5·13	6·56	8·27	11·75	17·49	50·86	100·0
	2. July—Dec. 1943	7·80	7·23	7·90	10·80	17·08	49·23	100·0
	3. Jan.—June 1944	10·14	9·76	8·70	9·90	16·99	44·54	100·0
	4. July—Dec. 1944	8·21	7·58	8·27	9·54	18·60	47·84	100·0
To Pioneer Corps	1. Jan.—June 1943	0·01	0·06	0·30	1·61	14·09	83·93	100·0
	2. July—Dec. 1943	—	0·04	0·10	0·48	8·30	91·08	100·0
	3. Jan.—June 1944	—	—	0·05	0·23	4·92	94·81	100·0
	4. July—Dec. 1944	0·02	—	0·01	0·13	5·26	94·59	100·0
Special Employment and Reduction of Category	1. Jan.—June 1943	9·81	11·75	15·28	18·71	20·25	24·83	100·0
	2. July—Dec. 1943	10·45	13·94	14·99	20·52	21·94	18·17	100·0
	3. Jan.—June 1944	12·90	13·48	15·92	14·02	19·22	24·47	100·0
	4. July—Dec. 1944	12·94	12·87	15·25	19·34	23·76	15·84	100·0
To Hospital	1. Jan.—June 1943	4·69	8·34	9·24	22·63	19·81	35·30	100·0
	2. July—Dec. 1943	8·73	7·79	23·36	13·99	18·31	27·84	100·0
	3. Jan.—June 1944	20·97	16·36	5·21	12·14	15·20	30·12	100·0
	4. July—Dec. 1944	14·95	10·37	8·35	24·07	12·85	29·41	100·0
Discharged from Army	1. Jan.—June 1943	—	3·05	4·21	5·33	22·42	65·00	100·0
	2. July—Dec. 1943	—	11·35	10·29	10·29	17·89	50·20	100·0
	3. Jan.—June 1944	0·95	5·17	4·44	3·44	9·64	76·38	100·0
	4. July—Dec. 1944	1·49	2·08	3·34	7·68	8·72	76·70	100·0

TABLE 204

Relative Liability of Personnel of Different Selection Grades to Specified Disposal at Army Selection Centres ; Mid-May 1943—Mid-May 1944

Disposal	S.G.1.	S.G.2.	S.G.3.+	S.G.3.—	S.G.4.	S.G.5.	Total
Not Seen	19·3	19·6	19·7	18·9	16·5	6·2	100·0
Seen but No Action	19·3	17·6	15·6	14·5	13·6	19·3	100·0
To Pioneer Corps	0·4	1·4	3·2	7·1	24·2	63·7	100·0
Change of Employment	19·0	18·0	16·5	16·5	15·1	14·9	100·0
Recategorization	22·2	19·8	16·1	17·3	14·8	9·9	100·0
Boys' Units	8·3	25·0	25·0	25·0	8·3	8·3	100·0
To Hospital	9·1	45·5	18·2	9·1	9·1	9·1	100·0
Discharged from Army	5·0	5·5	9·1	11·8	19·4	49·3	100·0

TABLE 205

Relative Liability of Personnel of Different Selection Grades to Specified Disposal at Army Selection Centres ; Mid-May 1944—December 1944

Disposal	S.G.1.	S.G.2.	S.G.3.+	S.G.3.—	S.G.4.	S.G.5.	Total
Not Seen	18·9	19·6	18·0	20·4	17·0	6·0	100·0
Seen but No Action	14·2	16·6	18·2	14·0	13·5	23·7	100·0
To Pioneer Corps	—	2·8	1·4	3·7	37·6	54·5	100·0
Change of Employment	19·4	17·4	14·7	17·1	15·1	16·3	100·0
Recategorization	19·0	18·5	16·1	16·4	15·5	14·6	100·0
Boys' Units	13·4	10·2	17·9	13·9	27·1	17·4	100·0
To Hospital	23·1	27·2	19·7	12·7	16·2	1·3	100·0
Discharged from Army	7·8	7·8	16·2	12·3	17·8	38·0	100·0

TABLE 206

Relative Liability of Personnel of Different Selection Grades to Specified Disposal at Army Selection Centres; 21 Army Group; May—October 1944

Disposal	S.G.1.	S.G.2.	S.G.3.+	S.G.3.—	S.G.4.	S.G.5.	Total
Not Seen	20·3	20·9	19·8	17·7	14·3	6·8	100·0
Seen but No Action	19·4	18·3	19·1	20·6	14·9	7·5	100·0
To Pioneer Corps	—	1·3	2·4	8·2	27·6	60·4	100·0
Change of Employment	15·5	18·4	15·0	15·4	17·1	18·6	100·0
Recategorization	10·7	13·7	19·9	20·6	20·8	14·1	100·0
Boys' Units	6·2	18·7	20·3	14·1	12·5	28·1	100·0
To Hospital	13·7	17·1	11·9	17·9	14·5	24·8	100·0
Discharged from Army	5·2	4·5	6·8	10·3	18·6	54·4	100·0

§4 PSYCHIATRIC DISORDERS IN THE MIDDLE EAST; OCTOBER 1943—MARCH 1945

DATA in this section come from monthly returns submitted to A.M.D. 11 by Military Psychiatric Hospitals and Out-Patients Centres in the Middle East theatre.

Admissions as In-Patients

There was a sharp drop of admissions (British Army) to Psychiatric Hospitals during the last period cited in Table 207. Although the strength of the Middle East theatre also fell then, the decrease is a real one. Table 208 shows that there was an increase in the proportion of mental defectives and of psychoneurotics evacuated after the end of 1943. This is probably due partly to increased facilities for evacuation as the Mediterranean became free for sea traffic. Throughout the period shown, the proportion of psychotics evacuated was over 90%, and in fact such cases made up about one half of all psychiatric cases evacuated (Table 209).

Disposal of Out-Patients at Psychiatric Centres

During the 18 months under review, the proportion of out-patients in each diagnostic category was constant. In accordance with psychiatric experience in other theatres, psychotics contributed only 5·8% to the total (Table 210). Table 211 shows how the proportions in different disposal groups altered. The percentage sent for treatment to psychiatric or other hospitals fell at the end of 1943 and an increasing proportion of men were downgraded in medical category. Table 212 shows types of disposal for each diagnostic category during the four periods. The disposal of psychoneurotics changed little between 1943 and 1945. An increasing proportion of mental defectives were downgraded. All but a trival proportion of psychotics were sent to psychiatric hospitals. The proportion transferred to other duties, or reduced in category is highest among mental defectives. Of the three *generic* diagnoses, psychoneurosis shows the highest proportion of men w.r.t. whom no action was taken.

Summary

The three main conclusions which these tables disclose are:

(*a*) after the end of 1943 approximately one half of all hospitalized psychiatric cases in M.E.F. were evacuated to the U.K.;

(*b*) although less than a quarter of all psychiatric cases admitted to hospital were psychotics, the latter made up over one balf of evacuated cases;

(*c*) less than one-quarter of psychiatric out-patients were sent to psychiatric hospitals.

TABLE 207

Admissions to and Discharges from Psychiatric Hospitals in M.E.F.; Crude Figures ; October 1943—March 1945

		ADMISSIONS						DISPOSALS			
		All Admissions (incl. Transfers)	Psychosis	Psycho-pathic Personality	Psycho-neurosis	M.D.	Others	All Disposals	Discharges and Evacuations	Transfers to Other M.E. Hospitals	Other Disposals*
BRITISH ARMY OTHER RANKS	Period 1 Oct.-Dec. 1943	1,206	266	81	685	58	116	1,215	898	303	14
	Period 2 Jan.-June 1944	1,792	465	143	901	107	176	2,055	1,637	350	68
	Period 3 July-Dec. 1944	1,410	300	97	747	84	182	1,429	1,125	279	25
	Period 4 Jan.-Mar. 1945	514	129	54	282	27	22	426	330	81	15
DOMINION TROOPS	Period 1 Oct.-Dec. 1943	77	37	2	33	1	4	88	55	33	—
	Period 2 Jan.-June 1944	115	49	10	43	7	6	134	42	91	1
	Period 3 July-Dec. 1944	74	23	5	11	1	34	44	13	31	—
	Period 4 Jan.-Mar. 1945	29	12	—	11	—	6	54	35	12	7
NON-EUROPEANS	Period 1 Oct.-Dec. 1943	206	106	8	60	8	24	267	162	104	1
	Period 2 Jan.-June 1944	393	157	25	122	26	63	321	210	102	9
	Period 3 July-Dec. 1944	541	190	43	143	28	137	490	251	220	19
	Period 4 Jan.-Mar. 1945	217	112	13	86	3	3	234	167	49	18

* Including Deaths.

NON-	Period 1 Oct.-Dec. 1943	[illegible]	[illegible]	8	60	8	24	267	162	104	1
EUROPEANS	Period 2 Jan.-June 1944	393	157	25	122	26	63	321	210	102	9
	Period 3 July-Dec. 1944	541	190	43	143	28	137	490	251	220	19
	Period 4 Jan.-Mar. 1945	217	112	13	86	3	3	234	167	49	18

* Including Deaths.

§4 (*contd.*) PSYCHIATRIC DISORDERS IN THE MIDDLE EAST; OCTOBER 1943—MARCH 1945

TABLE 208

Analysis of Each Class of Psychiatric In-Patients by Disposal (excl. Transfers to Other M.E. Hospitals); British Army Other Ranks; October 1943—March 1945

		Evacuated	Returned to Duty	To Duty in Lower Category, etc.	Total	Crude Figures
Period 1 Oct.-Dec. 1943	Psychosis	90·6	8·2	1·2	100·0	171
	Psychopathic Personality	51·4	28·6	20·0	100·0	70
	Psychoneurosis	11·1	51·3	37·7	100·0	552
	M.D.	41·2	17·6	41·2	100·0	51
	Others	20·4	63·0	16·7	100·0	54
	All Psychiatric Disorders	**31·6**	**40·1**	**28·3**	**100·0**	**898**
Period 2 Jan.-June 1944	Psychosis	96·5	3·1	0·4	100·0	513
	Psychopathic Personality	59·7	29·0	11·3	100·0	124
	Psychoneurosis	34·5	32·1	33·4	100·0	856
	M.D.	78·0	3·3	18·7	100·0	91
	Others	15·1	79·2	5·7	100·0	53
	All Psychiatric Disorders	**57·6**	**22·7**	**19·7**	**100·0**	**1,637**
Period 3 July-Dec. 1944	Psychosis	95·8	1·9	2·3	100·0	259
	Psychopathic Personality	61·0	27·3	11·7	100·0	77
	Psychoneurosis	33·1	37·7	29·2	100·0	644
	M.D.	68·1	6·9	25·0	100·0	72
	Others	19·2	74·0	6·8	100·0	73
	All Psychiatric Disorders	**50·8**	**29·2**	**20·1**	**100·0**	**1,125**
Period 4 Jan.-Mar. 1945	Psychosis	90·7	4·7	4·7	100·0	86
	Psychopathic Personality	62·2	21·6	16·2	100·0	37
	Psychoneurosis	25·4	47·5	27·1	100·0	181
	M.D.	77·8	—	22·2	100·0	9
	Others	5·9	94·1	—	100·0	17
	All Psychiatric Disorders	**47·0**	**34·5**	**18·5**	**100·0**	**330**

TABLE 209

Analysis of Disposals of Psychiatric In-Patients by Diagnostic Categories ; British Army Other Ranks ; October 1943—March 1945

		Psychosis	Psychopathic Personality	Psycho-neurosis	M.D.	Others	TOTAL	Crude Figures
Period 1 Oct.-Dec. 1943	Evacuated	54·6	12·7	21·5	7·4	3·9	100·0	284
	Return to Duty	3·9	5·6	78·6	2·5	9·4	100·0	360
	Duty in Lower Category, etc.	0·8	5·5	81·9	8·3	3·5	100·0	254
	All Disposals	19·0	7·8	61·5	5·7	6·0	100·0	898
Period 2 Jan.-June 1944	Evacuated....	52·5	7·8	31·3	7·5	0·8	100·0	943
	Return to Duty	4·3	9·7	73·9	0·8	11·3	100·0	372
	Duty in Lower Category, etc.	0·6	4·3	88·8	5·3	0·9	100·0	322
	All Disposals	31·3	7·6	52·3	5·6	3·2	100·0	1,637
Period 3 July-Dec. 1944	Evacuated....	43·4	8·2	37·3	8·6	2·5	100·0	571
	Return to Duty	1·5	6·4	74·1	1·5	16·5	100·0	328
	Duty in Lower Category, etc.	2·7	4·0	83·2	8·0	2·2	100·0	226
	All Disposals	23·0	6·8	57·2	6·4	6·5	100·0	1,125
Period 4 Jan.-Mar. 1945	Evacuated....	50·3	14·8	29·7	4·5	0·6	100·0	155
	Return to Duty	3·5	7·0	75·4	—	14·0	100·0	114
	Duty in Lower Category, etc.	6·6	9·8	80·3	3·3	—	100·0	61
	All Disposals	26·1	11·2	54·8	2·7	5·2	100·0	330

TABLE 210 **Analysis by Diagnosis of Psychiatric Out-patients; British Army; October 1943 — March 1945**

Period	Neurosis and Psychopathic Personality	Mental Defect	Psychosis	Others	TOTAL	Crude Figures
1. Oct.-Dec. 1943	74·1	4·9	7·4	13·5	100·0	3,622
2. Jan.-June 1944	77·2	6·0	4·9	11·9	100·0	5,169
3. July-Dec. 1944	74·0	5·7	5·5	14·9	100·0	4,715
4. Jan.-Mar. 1945	73·3	4·3	6·3	16·1	100·0	1,637
WHOLE PERIOD	75·0	5·5	5·8	13·7	100·0	15,143

TABLE 211 **Analysis of Psychiatric Out-patients by Recommended Disposal; British Army; October 1943 — March 1945**

Period	Returned to Unit—NO Action	For Observation in Unit or Out-Patient Department	To Psychiatric Hospital for Treatment	To other Hospitals or Non-psychiatric Wards	Reduction of Category	Transfer to Other Duties without Reduction of Category	Transfer to Other Duties with Reduction of Category	Other Methods of Disposal	TOTAL	Crude Figures
1. Oct.-Dec. 1943	31·2	9·0	31·4	4·3	9·2	5·9	3·5	5·5	100·0	3,622
2. Jan.-June 1944	32·9	13·8	21·6	4·1	10·7	5·5	3·6	7·8	100·0	5,169
3. July-Dec. 1944	40·4	7·6	23·2	2·9	12·5	3·9	5·4	4·1	100·0	4,715
4. Jan.-March 1945	38·1	7·5	24·2	2·9	14·5	2·7	5·2	4·9	100·0	1,637
WHOLE PERIOD	35·4	10·1	24·7	3·6	11·3	4·8	4·3	5·8	100·0	15,143

TABLE 212

Recommended Disposal of Psychiatric Out-patients according to Diagnosis; British Army; October 1943 — March 1945

(a)	Return to Unit—NO Action	For Observation in Unit or Out-Patient Department	To Psychiatric Hospital for Treatment	To other Hospitals or Non-psychiatric Wards	Reduction of Category	Transfer to Other Duties without Reduction of Category	Transfer to Other Duties with Reduction of Category	Other Methods of Disposal	TOTAL	Crude Figures
Psychoneurosis										
1. Oct.-Dec. 1943	30·9	11·1	29·6	4·1	10·5	6·1	3·3	4·5	100·0	2,685
2. Jan.-June 1944	31·3	15·0	20·6	4·3	11·7	5·6	3·8	7·7	100·0	3,991
3. July-Dec. 1944	36·6	8·9	22·8	2·4	14·7	4·6	6·6	3·4	100·0	3,488
4. Jan.-Mar. 1945	34·8	9·5	22·2	1·9	17·3	3·2	6·0	4·9	100·0	1,200
Mental Defect										
1. Oct.-Dec. 1943	28·1	3·4	18·5	0·6	16·9	13·5	7·3	11·8	100·0	178
2. Jan.-June 1944	16·4	9·0	17·0	0·6	19·3	14·8	10·0	12·9	100·0	311
3. July-Dec. 1944	38·2	4·5	11·6	1·1	24·7	6·0	8·2	5·6	100·0	267
4. Jan.-Mar. 1945	17·1	1·4	24·3	4·3	30·0	4·3	15·7	2·9	100·0	70
Psychosis										
1. Oct.-Dec. 1943	1·5	0·7	90·3	1·1	2·2	0·4	—	3·7	100·0	269
2. Jan.-June 1944	1·2	19·7	70·5	3·1	2·4	0·4	—	2·8	100·0	254
3. July-Dec. 1944	3·9	4·6	85·7	1·9	1·5	0·8	—	1·5	100·0	259
4. Jan.-Mar. 1945	1·0	—	88·3	1·9	1·9	—	—	6·8	100·0	103
Other Diagnosis										
1. Oct.-Dec. 1943	50·2	4·3	13·7	8·4	3·7	4·7	5·5	9·6	100·0	490
2. Jan.-June 1944	65·4	5·5	10·6	4·9	3·3	2·3	0·5	7·5	100·0	613
3. July-Dec. 1944	73·8	3·7	6·3	6·6	0·7	0·9	0·3	7·8	100·0	701
4. Jan.-Mar. 1945	72·7	3·0	8·0	7·2	2·7	0·8	0·8	4·9	100·0	264
All Psychiatric Disorders										
1. Oct.-Dec. 1943	31·2	9·0	31·4	4·3	9·2	5·9	3·5	5·5	100·0	3,622
2. Jan.-June 1944	32·9	13·8	21·6	4·1	10·7	5·5	3·6	7·8	100·0	5,169
3. July-Dec. 1944	40·4	7·6	23·2	2·9	12·5	3·9	5·4	4·1	100·0	4,715
4. Jan.-Mar. 1945	38·1	7·5	24·2	2·9	14·5	2·7	5·2	4·9	100·0	1,637

TABLE 212 (*contd.*)

Recommended Disposal of Psychiatric Out-patients according to Diagnosis; British Army; October 1943 — March 1945

(b)	Returned to Unit— NO Action	For Observation in Unit or Out-Patient Department	To Psychiatric Hospital for Treatment	To other Hospitals or Non-psychiatric Wards	Reduction of Category	Transfer to Other Duties without Reduction of Category	Transfer to Other Duties with Reduction of Category	Other Methods of Disposal	TOTAL	Crude Figures
1. Oct.-Dec. 1943										
Psychoneurosis	30·9	11·1	29·6	4·1	10·5	6·1	3·3	4·5	100·0	2,685
Mental Defect	28·1	3·4	18·5	0·6	16·9	13·5	7·3	11·8	100·0	178
Psychosis	1·5	0·7	90·3	1·1	2·2	0·4	—	3·7	100·0	269
Other Diagnosis	50·2	4·3	13·7	8·4	3·7	4·7	5·5	9·6	100·0	490
All Psychiatric Disorders	31·2	9·0	31·4	4·3	9·2	5·9	3·5	5·5	100·0	3,622
2. Jan.-June 1944										
Psychoneurosis	31·3	15·0	20·6	4·3	11·7	5·6	3·8	7·7	100·0	3,991
Mental Defect	16·4	9·0	17·0	0·6	19·3	14·8	10·0	12·9	100·0	311
Psychosis	1·2	19·7	70·5	3·1	2·4	0·4	—	2·8	100·0	254
Other Diagnosis	65·4	5·5	10·6	4·9	3·3	2·3	0·5	7·5	100·0	613
All Psychiatric Disorders	32·9	13·8	21·6	4·1	10·7	5·5	3·6	7·8	100·0	5,169
3. July-Dec. 1944										
Psychoneurosis	36·6	8·9	22·8	2·4	14·7	4·6	6·6	3·4	100·0	3,488
Mental Defect	38·2	4·5	11·6	1·1	24·7	6·0	8·2	5·6	100·0	267
Psychosis	3·9	4·6	85·7	1·9	1·5	0·8	—	1·5	100·0	259
Other Diagnosis	73·8	3·7	6·3	6·6	0·7	0·9	0·3	7·8	100·0	701
All Psychiatric Disorders	40·4	7·6	23·2	2·9	12·5	3·9	5·4	4·1	100·0	4,715
4. Jan.-Mar. 1945										
Psychoneurosis	34·8	9·5	22·2	1·9	17·3	3·2	6·0	4·9	100·0	1,200
Mental Defect	17·1	1·4	24·3	4·3	30·0	4·3	15·7	2·9	100·0	70
Psychosis	1·0	—	88·3	1·9	1·9	—	—	6·8	100·0	103
Other Diagnosis	72·7	3·0	8·0	7·2	2·7	0·8	0·8	4·9	100·0	264
All Psychiatric Disorders	38·1	7·5	24·2	2·9	14·5	2·7	5·2	4·9	100·0	1,637

Part X. MAJOR SOURCES OF WASTAGE

§1 HERNIA

IN terms of man-day wastage among males (Chart 6) Hernia contributed more to hospitalization in the United Kingdom than any other single diagnostic category, and indeed, more than the *entire* class of psychiatric disorders. Statistics set forth in Part VI § 2 reveal a very striking difference with respect to its incidence in different age groups among hospital admissions on the one hand and invalidings on the other. This circumstance alone prompts further investigation of documentary sources; and the attempt to clarify it has elucidated information of other sorts. The results shed light on the following questions:

(*a*) what circumstances determine recourse to surgical procedure;

(*b*) what measure of success attends such treatment;

(*c*) to what circumstances failure of surgical treatment is attributable.

The sources of the data dealt with are: (*a*) Hollerith tabulations of A.Fs.I1220; (*b*) the clinical notes of a sample of the same; (*c*) outpatients records of two military hospitals (Millbank and Shaftesbury). The Hollerith tabulations (*a*) referred to all cases of inguinal and femoral hernia admitted to United Kingdom hospitals for operation between July 1943 and June 1944. For the following reasons this population, consisting only of cases for operation, is smaller than the total hernia population of the Army in the United Kingdom:

(i) failure of some E.M.S. hospitals to return A.F.I1220;

(ii) refusal of patients disposed of as surgical outpatients (S.O.P.) to submit to any operation;

(iii) disabilities contra-indicating operation;

(iv) refusal to submit to operation after recurrence of hernia.

In view of the fact that many out-patients refuse operation, especially after recurrence which is frequent (*see below*), wastage assessed by hospitalization statistics or by invalidings leads to a very conservative estimate of total wastage attributable to hernia alone. A complete specification of such wastage should take account of downgradings in S.O.P. To obtain requisite information would entail an *ad hoc* field enquiry not as yet undertaken.

For the year specified (mid 1943-mid 1944) the number of A.Fs.I1220 recording *first* hernia operations and operations for recurrent hernia in the United Kingdom were respectively 6,874 and 646. These figures refer to males only. If we make due allowance for estimated leakage indicated in (i) above this makes the annual operation rate about 5 per 1,000 strength, which would be alarming enough if the period of hospitalization were short. In fact, it is not short.

Duration of Hospitalization

Indeed, what makes Hernia a major source of wastage is in large measures the protracted period of hospitalization involved, mean duration of stay in hospital and Convalescent Depot being about 3 months. Examination of our sample shows that this figure is subject to little variation with respect to type of hospital, type of hernia, operative procedure or post operative complications. The distribution of a sample of 629 cases among E.M.S. and Military hospitals was approximately in the ratio 5 : 4. The disposal of the 6,874 primary cases was:

Returned to Unit from C.D. or hospital	99·43
Downgraded to Category E *in hospital*	00·50
Died	00·07
Total	100·00

Age and Incidence

As stated, a consideration which initially prompted this enquiry into hernia statistics was a flagrant discrepancy between the relation of age to: (*a*) operative treatment as indicated by hospitalization statistics; (*b*) medical discharge as shown by downgradings to Category E. The relative age distributions of the two classes separately are in Table 213.

From this table we see that: (*a*) relative incidence of operation at different ages varies little and displays no characteristic trend; (*b*) relative incidence of discharge increases with advancing age and very steeply in the terminal age groups. The contrast these figures present prompts enquiry into several issues, including the relation of risk at different ages to onset, recurrence, disinclination to submit to operation, contra-indications and type. We have at best meagre information about any of these.

Relative Frequency of Types

A sample sort of 583 A.Fs.I1220 yielded information with respect to the several types of hernia commonly distinguished, as shown in the table below. For two reasons, figures cited are not necessarily representative of any other male population of the same age group: (*a*) the army is itself a highly selected one from this viewpoint; (*b*) numbers of the several types are not so large as to permit standardization with respect to liability in different years of life.

Type of Hernia	All.	Unilateral	Bilateral	
			Simultaneous	Successive
Indirect....	85·6	80·7	4·7	0·2
Direct	10·0	7·8	1·9	0·2
Femoral....	4·4	4·3	0·2	0·0
TOTAL	100·0	92·8	6·8	0·4

The figures cited above show that wastage due to successive, as opposed to simultaneous, operation on *bilateral* hernias is trivial. The conclusion which calls most for emphasis is that the class of hernias deemed to

require least skilful attention constitute 85% of the whole. The ensuing figures indicate the relative frequency of multiple as opposed to single recurrences:

Original Condition	No. of Operations		
	1 Recurrence	2 Recurrences	3 Recurrences
Unilateral Inguinal Hernia	481	39	4
Bilateral Inguinal Hernia, one side recurred	71	8	2
Bilateral, both sides recurred	28	0	1
TOTAL	580	47	7

Incidence of Operation

As stated above, out-patient records were the source of information with respect to recourse to operative procedure. The Millbank (1943-44) sample contained so high a proportion of low medical category personnel as to cast doubt on general conclusions derived therefrom. The records of Shaftesbury M.H. refer to a large area with many units undergoing field training; and we may regard them as more representative, since the period covered is before D-day.

Table 214 shows the distribution by medical category of 197 cases seen in the Surgical Out-patient Department in 1943, together with their disposal. It includes only first occurrences among male O.Rs. The *net operability rate* here signifies the percentage of individuals consenting to operation. Such cases should be traceable through the Central A.F. I1220 file, and, therefore, constitute part of the cases discussed in the previous paragraphs. The percentage of cases *advised* operation (the *gross operability rate*) appears in the extreme right-hand column.

In round figures Table 214 shows: (*a*) 90% of hernia cases in the Army are deemed to be suitable subjects for operations; (*b*) only 60% of hernia cases submit to operation. There is thus a 30% *concealed wastage* in terms of downgrading. Table 215 shows a comparable sample of recurrences taken from the same hospital for the same period.

Two conclusions merit comment: (*a*) 80% of recurrences are deemed fit subjects for a second operation; (*b*) 51% of cases of recurrence do, in fact, submit to operation. With due allowance for sampling errors, the net operability rate for recurrence lies between 37% and 65%.

Types of Operation

The ensuing table in the text includes all cases repaired with fascia, whether from external oblique or fascia lata of the thigh, under the term *hernioplasty*. Cases in which the sac was excised and/or only the cremasteric fascia was sutured appear under the heading *herniotomy*. All other cases appear under herniorrhaphy. Finer breakdown was impossible owing to inadequacy of the surgical notes in the relevant documents. Furthermore, there is evidence to show that absolute uniformity of nomenclature with respect to the same procedure does not prevail. Indeed, inconsistencies were sometimes apparent in one and the same document.

Primary Operation	All Cases	Recurrent Cases
Herniotomy	$25 \cdot 6 \pm 1 \cdot 8$	$32 \cdot 7 \pm 2 \cdot 9$
Herniorrhaphy	$62 \cdot 0 \pm 2 \cdot 0$	$60 \cdot 5 \pm 2 \cdot 9$
Hernioplasty	$12 \cdot 4 \pm 1 \cdot 3$	$6 \cdot 8 \pm 1 \cdot 6$
Total	100·0	100·0
Sample No.	629	260

Analysis of these figures shows that recurrence was highest among cases initially treated by herniotomy and least among cases treated by hernioplasty.

The Table below shows the type of hernia recorded on the initial operation card tabulated against the findings at the *first* recurrence.

Condition at Primary Operation	Indirect Hernia	Direct Hernia	Unspecified	Total
Indirect Hernia	121	57	8	186
Direct Hernia	8	32	1	41
Total	129	89	9	227

On the assumption that we here have a random sample of *all* recurrent hernias $56 \cdot 8 \pm 3 \cdot 3$ of all recurrences are *indirect* hernias, i.e. *a condition which should have been remedied at the primary operation.* This is in accordance with a conclusion reached in the *Journal of the R.A.M.C.* 78, pp. 283-4. In a series of 175 consecutive operations, 19 were for recurrence and of these 15 were of the indirect type. This represents $78 \cdot 9\% \pm 18 \cdot 6\%$. The percentage difference w.r.t. indirect hernia among recurrences is 22·1 and its s.e. 10·0. The proportion in the former is therefore significantly lower; but the conclusion drawn from the small sample is correct. That is to say, failure to excise the sac is the main cause of recurrence.

In our sample 9 oblique sacs were apparently missed among 41 operations for direct inguinal hernia. The table below shows a breakdown of primarily indirect hernia, subdivided according to primary operative treatments and tabulated with respect to the type of sac found at the first recurrence.

Original Operation	Indirect	Direct	Unspecified	Total Cases	% Indirect Recurrences
Herniotomy	52	12	1	65	$81 \cdot 3 \pm 5 \cdot 0$
Herniorrhaphy	57	36	6	99	$61 \cdot 3 \pm 4 \cdot 9$
Hernioplasty	3	5	0	8	$37 \cdot 5 \pm 17 \cdot 5$

The trend of the figures shows that the simpler operation is associated with a greater proportion of failures to find the sac. The difference (20%) between herniotomy and herniorrhaphy is thus nearly three times its standard error (7·0%). The number of hernioplasties in the series is too small to validate comparison. There are no data which directly justify a judgment with respect to this difference; but hurry and reliance on less experienced surgeons for the simpler operation are conceivable possibilities.

Incidence of Post-Operative Complications

If we are entitled to assume that absence of any specified disorder on the case record card denotes absence of complications, we may take figures cited below at their face value. At least they represent a minimum incidence of infection or supervening respiratory complaints. As regards the latter, all infections from bronchitis to collapse of lung appear here under one head, whether mild or severe. Finer breakdown seems scarcely justifiable in view of the incomplete nature of the records. The relevant figures are as follows:

Number with respiratory complications	80 cases
Total number of operations	1,247 cases
% incidence	6·4% ± 0·7%

From the ensuing table it would appear that there may be increased liability to complications following the bilateral operation; but the difference is not significant.

Operation	Cases	% Complications
Unilateral	559	6·4 ± 1·0
Bilateral	42	9·5 ± 4·6
TOTAL	601	

Infection of the wound may range from stitch abscess to general breakdown recorded only as present or absent. The table below shows no difference between primary operations and operations for recurrence with respect to infection rates.

	Cases	% Complications
Primary	585	7·7 ± 1·1
Recurrence	646	7·6 ± 1·1

Figures for a similar series in *Annals. Surg.* 1937 (cvi pp. 363-72) refer only to severe cases, neglecting stitch abscesses and minor wound infections. These appear to constitute about half of all wound infections, if not more. If it is reasonable to assume that stitch sinuses are recorded when they occur in our own series, they make up less than 1% of all cases.

Recurrence Rates

The table below shows the proportion of recurrent hernias which recur in successive periods after the initial operation. Comparable figures from an article in the *Medical Bulletin of Veteran Administration* appear in the extreme right-hand column.

Time to Recurrence	%	M.B.V.A. Series
Under 1 year	60·2	50·0
1–2 years	16·1	11·5
2–3 years	8·0	6·1
3–4 years	4·3	3·0
Over 4 years	11·4	29·4
No. of operations	524	164

The above sample of 524 refers only to individuals whose records were complete among 646 for the period mid-1943 to mid-1944. Of these 646 we may take it that 60·2%, or 389, had a previous operation in less than one year. From our statistics of net operability for recurrence (51·0±7·0) shown in Table 215 we may take it that the proportion of operations among all recurrent cases lies between 37·0% and 65·0% in the range included by twice the standard deviation about the mid-value; thus these 389 subsequent operations correspond to 389÷0·65 or 389÷0·37 cases of recurrence in the first year after the initial one, according as we take the upper or the lower figure as limiting values. We have thus two estimates of recurrence within one year during the period referable to first operations to which we can ascribe as the *mean* date mid-1943. The upper one is 1,051 and the lower one is 598. Without serious likelihood of error we may assume that the hernia rate for the Army in the period mid-1943 to mid-1944 was not much different from that of the 1 year period whose mid-date was June 1943; and since there was little change of the total strength of the Army in the United Kingdom between June 1943 and December 1943, the mid-dates to which primary operations responsible for these estimated cases of recurrence and our figure for all primary hernias respectively refer, we may regard the latter figure (6,874) as the relevant population at risk. This leads to the following estimates of recurrence *within one year*: (*a*) 1,051÷6,874=0·153; (*b*) 598÷6,874=0·087. It is here pertinent to cite Brigadier Edwards (*Proc. Roy. Soc. Med.* 1943, *vol.* 36, p. 185). His belief, admittedly unsupported by exact figures, is that recurrence occurs after *at least* 12% of all operations. The Mid-value of the two estimates (8·7% and 15·3%) cited above is 12% for recurrence in *the first year alone*.

Conclusion

In view of the fact that hernia makes a major contribution to man-day wastage in the service the two following conclusions are noteworthy:—

(*a*) after about *one out of every eight* primary operations the original condition reappears within twelve months;

(*b*) the overwhelming majority of such recurrent cases are the result of an operation for the performance of which a relatively modest level of professional skill is perhaps too commonly deemed to suffice.

Figures cited in support of the above do not, in fact, attest that a lower recurrence rate would prevail if more specialised skill were allocated to surgical treatment of hernia; but the fact that recurrence is mainly due to failure to deal effectively with the sac suggests the possibility of appreciably reducing this source of wastage by appropriate measures.

TABLE 213 **Hernia—Age and Relative Risk**

	Under 22	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	Over 45	Total
Hospital Admissions (crude figures)	1,387	860	792	888	900	778	655	416	117	70	6,863
Relative Incidence of Hospital Admissions	12·4	7·6	7·4	8·4	9·5	11·0	12·3	12·2	11·0	8·2	100
Relative Incidence of Invalidings	0·4	0·3	0·5	1·2	1·7	2·9	5·3	10·0	14·6	63·0	100

TABLE 214 **Hernia—First Occurrences**

Medical Category	Operation Accepted	Operation Refused	Operation Not Advised	Total	Net Operability Rate	Gross Operability Rate
A	86	29	4	119	$72{\cdot}3\pm4{\cdot}2$	96·6
B	29	30	13	72	$40{\cdot}3\pm5{\cdot}8$	82·0
C	0	2	4	6	0	33·3
TOTAL	115	61	21	197	$58{\cdot}4\pm3{\cdot}2$	89·3

TABLE 215 **Hernia—Recurrent Cases**

Medical Category	Operation Accepted	Operation Refused	Operation Not Advised	Total	Net Operability Rate	Gross Operability Rate
A	19	7	2	28	$67{\cdot}9\pm9$	92·9
B	6	8	5	19	$31{\cdot}6\pm11$	73·7
C	2	1	3	6	$33{\cdot}0\pm19$	66·7
TOTAL	27	16	10	53	$51{\cdot}0\pm7$	81·1

§2 PERFORATED PEPTIC ULCERS

THAT Peptic Ulcer is one of the major sources of wastage attributable to disease is true whether the yardstick applied is its proportionate contribution to invalidings (13%), deaths due to sickness (5%) or to man-day wastage in the United Kingdom (1·3%). The figures here cited in parenthesis refer to 1943. The examination of a sample of A.F.s I1220 referring to the graver type of case, i.e. those with perforation of the gut wall, provides an opportunity for getting precise information on: (*a*) the relation of age to the severity of ulceration; (*b*) the relation of site to frequency, mortality and subsequent complications. The sample selected consists of United Kingdom cases for the years 1942-44. Its size was 551, of which 14 were not specified as gastric or duodenal in the clinical record. Of the remainder, 174 were gastric and 363 duodenal. In the sample as a whole 3 cases are known to have had a previous operation for perforation. Of 121 cases for which information concerning interval between perforation and operation was available, 110 were operated on within 24 hours. Among these 110 there were 9 deaths. There were 4 deaths among the residual 11.

Relation of Age to Risk of Perforation

Relative age-incidence distributions, as shown in the first two lines of Table 216, disclose increasing frequency of perforated ulcers with increasing age. Since liability to peptic ulceration itself becomes greater with advancing age, the trend of these figures does not necessarily indicate that liability to perforate also increases in the same way. To ascertain whether this is, in fact, so, it is necessary to relate the age distribution of perforations with the true population at risk in this context, i.e. that of ulcers as a whole. The last line records the result of doing so, i.e. it displays the relative liability of an ulcer to perforate as age advances. It discloses no decisive trend; and we may therefore conclude that age (within the range specified) does not conspicuously affect liability to perforation.

Relation of Site to Risk of Perforation

Since duodenal ulcers are much more common than gastric ulcers, the fact that the surgeon meets duodenal more commonly than gastric perforations does not of itself indicate that gastric ulcers less commonly perforate, and is, indeed, consistent with the opposite conclusion. Analysis of the sample from this point of view appears below. The figures in the middle column show the proportionate composition of the relevant population at risk, and the extreme right-hand column shows the true relative liability to perforation obtained by dividing figures in col. (i) by corresponding ones in col. (ii) and reducing the quotients to the same (*percentage*) scale.

	(i) Rel. Frequency Perforations (551)	(ii) Rel. Frequency *All* Peptic Ulcer Cases	(iii) Rel. Liability to Perforation
Gastric	31·6	19·4	53·8
Duodenal	65·9	75·9	28·7
Unspecified	2·5	4·7	17·6
Total	100·0	100·0	100·0

With due regard to the fact that gastric ulcers are less common than duodenal ulcers, the data thus show that liability of a gastric ulcer to perforate is about twice as great as that of an ulcer of the duodenum.

Relation of Site to Fatality

The next table shows a breakdown of the whole sample w.r.t. fatality and site.

Type	No. of Cases	Deaths	Fatality %
Gastric	174	16	9·2±2·2
Duodenal	363	17	4·7±1·1
Unknown	14	0	0
Total	551	33	6·0±1·0

It would seem that perforation of the gastric wall is more liable to prove fatal than perforation of the duodenum; but the difference (4·5%) is somewhat less than twice its standard error (2·5%). So a high level of significance does not pertain thereto. Below is a breakdown of peptic ulcers as a whole w.r.t. intra-abdominal complications recorded for 37 cases and the fatality associated with each.

Complication	No. of Cases	Deaths	Fatality %
Peritonitis	11	8	72·7±14·0
Abscess formation	12	1	8·3± 8·0
Subphrenic	6	1	
Pelvic	3	0	
Local	2	0	
Other	1	0	
Haemorrhage from ulcer	8	7	87·5±12·0
Double perforation	3	2	66·6±27·0
Intestinal obstruction	3	2	66·6±27·0

The above figures show that peritonitis and haemorrhage from the ulcer site are the main causes of death. The following figures show what contribution ascribed causes of deaths make to net fatality at the two sites None of the differences w.r.t. site are striking.

Cause of Death	Gastric Ulcer	Duodenal Ulcer	All
Peritonitis	2·9±1·4	1·7±0·7	2·0±0·6
Haemorrhage	2·3±1·2	0·8±0·5	1·3±0·5
Chest Infections....	1·1±0·8	0·3±0·15	0·5±0·3
Pulmonary embolism	0·0	0·3±0·15	0·2
Shock	0·6±0·6	0·6±0·4	0·6±0·3
Intestinal Obstruction	0·0	0·8±0·5	0·5±0·3
Others	2·3±1·2	0·3±0·15	1·0±0·5
Total	9·2±2·2	4·7±1·1	6·0±1·0

H. Lewis Burson (*American Journal of Surgery*) reports 23 deaths in a sample of 154 divided as in the first line below. Corresponding fatality rates for the present sample occur underneath in italics. Both samples concur in pointing to higher fatality from perforation in the older

segment of the population, and it is suggestive that the discrepancy is less in the Army sample, which excludes higher age groups present in a civilian community.

Under 40 *years of age*	*Over* 40 *years of age*
$6 \cdot 5 \pm 2 \cdot 7$	$23 \cdot 3 \pm 5 \cdot 0$
$5 \cdot 3 \pm 1 \cdot 0$	*$12 \cdot 5 \pm 4 \cdot 0$*

The next table shows a breakdown with respect to type of hospital where treatment took place. The difference is not significant.

Hospital	No. of Cases	Deaths	Fatality %
E.M.S.	184	16	$8 \cdot 7 \pm 2 \cdot 2$
Military	118	9	$7 \cdot 6 \pm 2 \cdot 5$

Summary

The following conclusions emerge from data set forth in this section:

(*a*) Fatality w.r.t. ulcer perforation in the Army (United Kingdom 1942-4) was about 6%. The main causes of death are peritonitis and haemorrhage at the site of the ulcer.

(*b*) Gastric ulcers are about twice as liable to perforate as are duodenal.

(*c*) Liability to perforate is not conspicuously affected by age of onset within the age-range of an Army population.

TABLE 216 **Perforated Ulcers**

DIAGNOSIS	AGE IN YEARS										NO. OF CASES
	<22	22-24	25-27	28-30	31-33	34-36	37-39	40-42	43-45	>45	
Relative Incidence of Gastric Ulcer (perforated)	3·5	3·8	5·2	4·2	6·6	7·3	13·6	9·8	18·5	27·5	174
Relative Incidence of Duodenal Ulcer (perforated)	1·0	5·1	6·1	5·6	9·7	10·7	4·1	7·1	21·9	28·6	363
Relative Risk of Perforation .... (All Peptic Ulcers)	12·3	14·5	13·8	7·4	10·3	8·4	7·0	5·4	8·4	12·2	7,200

§3 APPENDICITIS

AMONG major sources of wastage as assessed by man-days lost to service on account of disease, those that rank highest in the United Kingdom are hernia among men and appendicitis among women. In this context, the latter merely signifies conditions so designated on the hospital record card. In the United Kingdom hernia and appendicitis (so defined) were responsible for about 10% of all wastage w.r.t. sickness in males and females respectively. Among men appendicitis makes a comparatively trivial contribution, a circumstance partly due to its relatively high incidence in the younger age groups which predominate in the A.T.S. (Part II §1). Even so, the *age standardized* incidence in A.T.S. (auxiliaries) is almost exactly twice (2·03) as high as among military O.R.s. How far this reflects an intrinsic sex difference and how far it is referable to unsatisfactory diagnosis is an issue both of general biological interest and of administrative significance *vis-a-vis* treatment. An enquiry based on a study of a random sample of A.Fs. I1220 was undertaken to throw further light on it. The sample itself refers to the period August, 1943—July, 1944.

Validity of Diagnosis

For the purpose of assessing the validity of the diagnosis cited, the sample is initially divisible into two groups:

	Males	Females
No operation	29	18
Appendicectomy	380	298
Total	409	316

The clinical notes on the larger class often record the condition of the appendix at the time of operation. On this basis we may divide the sample into 5 groups: acute inflammation, interval cases, normal, indefinite (*see* below) and unspecified:

	Males (380)	Females (298)
Acute Inflammation	50·2	20·8
Interval cases	4·2	4·4
Normal....	4·0	6·7
Indefinite	14·7	28·2
Unspecified	26·8	39·9
Total	100·0	100·0

From this preliminary analysis of appendix pathology at operation it is clear that the proportion of indisputable cases of appendicitis among males for whom appendicitis is the specified diagnosis is about twice as high as among females, and the proportion of certainly normal cases is about half as great. For a more refined assessment, it is necessary to make a more detailed analysis of the large classes of cases here designated as *unspecified* and *indefinite*. In all, 102 record cards of males and 119 of females contained no information concerning the condition of the appendix at operation, but among these the diagnosis of a high proportion was sufficiently explicit to justify confidence in its authenticity. We may split these cases thus:

Unspecified Pathology

Diagnosis Cited on A.F. I1220	Males (102)	Females (119)
A. Acute and Subacute	64·7	42·9
B. Recurrent and otherwise unspecified	35·3	57·1
Total	100·0	100·0

We may thus exhibit as below the entire sample of 380 males and 298 females who submitted to operation, including only class A above in the group specified as acute and assigning B to the group specified as indefinite:

	Males (380)	Females (298)
Acute Pathology	67·6	37·9
Interval cases	4·2	4·4
Normal appendix	4·0	6·7
Indefinite	24·2	51·0
Total	100·0	100·0

A similar analysis of the group concerning which information w.r.t. appendix at operation is here described as *indefinite* yields the following:

Indefinite Pathology

Diagnosis Cited on A.F.I1220.	Males (56)	Females (84)
A. Acute and Subacute	39·3	33·3
B. Recurrent and otherwise unspecified	60·7	66·7
Total	100·0	100·0

Accordingly, we can set a more satisfactory limit to true cases of appendicitis by removing Class A in this table to the first row in its predecessor and leaving Class B only under the item designated indefinite:

	Males (380)	Females (298)
Acute Pathology	73·4	47·3
Interval cases	4·2	4·4
Normal appendix	4·0	6·7
Indefinite	18·4	41·6
Total	100·0	100·0

Our residual indefinite class now consists of cases w.r.t. which the pathological findings are inconclusive and the clinical records fail to provide convincing grounds for a positive diagnosis. There is therefore strong presumptive evidence in favour of regarding them as normal individuals in so far as concerns the condition of the appendix. If we do so, the final result of our analysis shown below is consistent with the great preponderance of males with an acutely inflamed appendix accredited by post-operative examination.

	Males	Females
Acute Pathology and Interval Cases	77·6	51·7
Normal	22·4	48·3
Total	100·0	100·0

If we now denote by S_i the correct ratio of incidence of appendicitis among females to appendicitis among males and by R_i the apparent ratio based on the recorded diagnosis the figures of the last table lead to the estimate:

$$S_i = 0{\cdot}66\ R_i$$

Since the age standardized value of R_i (Part II §1) is 2·03:

$$S_i = 1{\cdot}34$$

If we take the conservative view that only cases cited in the first breakdown as acute or interval are appendicitis *sensu stricto*, the percentages for males and females respectively are 54·4 and 25·2, whence $S_i = 0{\cdot}46 R_i = 0{\cdot}93$.

Subject to one qualification discussed below, this means that due allowance for errors or uncertainties of diagnosis substantially reduces the sex differential estimated in accordance with the face value of the statistical data; and whether any difference remains when we have eliminated all cases w.r.t. which closer scrutiny of the records suggests the possibility of faulty specification is open to doubt. The qualification mentioned arises from the use of the age standardized ratio in the preceding argument, the validity of which therefore depends on the assumption that cases for which appendicitis is the assigned diagnosis constitute a homogeneous population w.r.t. the relation of incidence to age. That this is a permissible assumption is seen from the following ratios of cases of *proven* to *all* cases of appendicitis recorded as such in successive age groups:

Age	<22	22–24	25–27	28–30	31–33	34–36	37–39	40–42	>42
Males	0·48	0·42	0·55	0·50	0·45	0·36	0·48	0·60	0·29
Females	0·24	0·16	0·21	—	—	0·25			

Pathological Findings

The following table exhibits in detail macroscopic information *as given* w.r.t. cases described above as *indefinite.*

Diagnosis	*Condition of Appendix*	*Males*	*Females*
Acute		(*5*)	(*5*)
	Kinking and adhesions	5	2
	Concretions	0	1
	Mild inflammation	0	2
Subacute		(*17*)	(*23*)
	Subacute inflammation	9	11
	Pathological	2	1
	Adhesions, kinking, slight congestion, chronic inflammation	6	11
Recurrent		(*25*)	(*36*)
	Chronic or mild inflammatory changes	8	13
	Pathological	2	0
	Adhesions	12	18
	Concretions	3	5
Unspecified appendicitis		(*9*)	(*20*)
	Chronic or mild inflammatory changes	0	11
	Fibrosed at tip	1	0
	Long tortuous	1	0
	Adhesions	4	0
	Concretions	3	9
Totals		56	84

Abscesses were recorded of 11 men but only of one auxiliary. Treatment was as follows:

Treatment	*Males*	*Females*
Drained without appendicectomy	6	0
Conservative	4	1
Unspecified	1	0
Total	11	1

The male cases described above under the heading *conservative* include one laparotomy with primary closure. *Delayed appendicectomy* (Ochsner-Sherren treatment) is recorded of 16 men and 13 auxiliaries. For 9 out of the 13 female patients, but none of the male, operation was necessary before the original infection had subsided in response to conservative treatment. The pathological findings of these interval cases were as follows:

Pathological Finding	*Treatment*	*Males*	*Females*
Abscess recorded		(10)	(0)
	No drainage	3	0
	Drained	7	0
No abscess recorded		6	13
Total		16	13

Previous History of Cases

With respect to previous history of cases the clinical notes are divisible into those which record previous symptoms, those which definitely record the absence of such and those which do not explicitly specify one or the other:

	Males (409)	*Females* (316)
Previous symptoms	28·4	50·9
No previous symptoms	8·3	6·1
No explicit information	63·3	43·0
Total	100·0	100·0

Whether we distribute the class of cases about which we have *no explicit* information proportionately among the other two or add them to the second as presumptively cases with no previous symptoms, there is a noteworthy proportionate excess of females with previous symptoms of roughly the same order as the proportionate deficiency w.r.t. post-operative confirmation of the diagnosis cited. This circumstance reinforces the general conclusion which emerges from the foregoing analysis. It is therefore pertinent to examine post-operative information w.r.t. the appendix *vis-a-vis* explicit information concerning previous attacks, excluding the class concerning which no such information is to hand.

Pathological Finding	*With Previous Symptoms*		*Without Previous Symptoms*	
	Males (104)	*Females* (159)	*Males* (35)	*Females* (17)
Acute inflammation	37·5	15·7	68·6	58·8
Pelvic abscess	1·0	0·6	5·7	0·0
Interval cases	2·9	4·4	8·6	11·8
Normal	11·5	6·3	0·0	5·9
Indefinite and unspecified	47·1	73·0	17·1	23·5
Total	100·0	100·0	100·0	100·0

A noteworthy feature of the preceding figures is that the discrepancy with respect to male and female incidence is greatly reduced when we separate from the group as a whole those with previous symptoms leaving only cases w.r.t. which diagnosis depends on the condition of the patient at the time of operation and is therefore more likely to be conservative. The *only* recorded case of nematode infestation of the appendix was *one* male stated to have had no previous symptoms.

Post-operative Complications

The only death in the series was due to a pulmonary embolus (A.T.S.) on the sixth day after operation. The clinical notes state that the appendix, bound down at the centre, was otherwise normal. Complications (singly present *or* together) recorded of 59 males (15·5%) and 24 females (8·1%) appear in the table below, where the figures cited are percentages of *all* cases subjected to operation. There is a notable excess of major complications *i.e.* chest (pneumonia, bronchitis, lung collapse) and wound sepsis among the males, a circumstance which may be partly attributable to age rather than to sex. The cases of wound sepsis cited refer only to primary closure without drainage of the pelvis.

	Males	*Females*
Chest	7·9	2·0
Wound sepsis	6·3	3·7
Peritoneal abscesses	2·4	1·3
Wound haematoma	0·3	0·0
Pulmonary embolus (alone)	0·3	0·3
Femoral thrombo-phlebitis	0·3	0·3
Shock	0·0	0·3

Co-existing Conditions

The conclusion to which all data already examined point is that the Army sex differential w.r.t. incidence of appendicitis is almost exclusively attributable to two circumstances: (*a*) differences w.r.t. age composition of the population at risk; (*b*) more frequent occurrence among women of pathological conditions which simulate appendicitis. If this is correct, it follows that co-existing conditions whose symptoms are liable to be identified with those of appendicitis are more common among women than among men. That this is so, is indeed a commonplace; but the magnitude of the difference is at least worthy of more precise definition.

Analysis of records of 380 males subjected to the operation to elucidate co-existing conditions liable to confusion with appendicitis on the basis of clinical examination revealed one case of *gastroenteritis* associated with a normal appendix. The condition of the appendix was reported as pathological w.r.t. 4 cases of *dyspepsia* and 2 cases of *malaria*. The appendix of one patient with *acute pyelitis* was stated to be injected at the tip. At most only 2 of these (0·5%) were examples of mistaken diagnosis. Other co-existing conditions (tonsillitis, scabies, psoriasis, inguinal hernia) were not such as to enter into the differential diagnosis of appendicitis *sensu stricto*.

Apart from conditions last named, records of the female sample of 298 disclosed 21 cases (7·0%) with disorders which give rise to difficulties w.r.t. differential diagnosis. The figures cited below do not include cases (*e.g.* 2 of salpingitis and 2 of tuberculous adenitis) with an accompanying record of pathological findings w.r.t. the appendix at operation.

Pregnancy	4
Salpingitis	2
Ovarian cysts	8
Tuberculous Adenitis	2
Mesenteric Adenitis	2
Congenital Syphilis	1
Acute Pyelitis	1
Dysmennorhoea	1

Summary

In comparable samples of Military O.Rs. and Auxiliaries cited as cases of appendicitis on A.F. I1220 the proportion of female patients subjected to operation which exposes no (or insufficient) confirmatory indication is much higher than that of males; and the proportion of cases associated with co-existing conditions liable to be attributed to the appendix is also higher. With due allowance both to mistaken diagnosis and to age, the incidence of appendicitis *sensu stricto* among women exceeds that among men in service much less than figures based on the face value of the records would suggest; and the existence of a true sex differential is open to doubt.

§4 INTERNAL DERANGEMENT OF THE KNEE

AMONG men, Internal Derangement of the Knee (I.D.K.) ranks as a major source of wastage, alike w.r.t. incidence and to man-days lost to service. From the figures available for 1943 it appears that the absolute incidence in the United Kingdom was about 0·3%. The relative morbidity rate was 1·7% and the relative wastage rate 4·1%. That is to say, I.D.K. accounted for over 4% of man-days lost to service on account of sickness. In the same year it accounted for 0·5% of discharges on account of sickness from the Army as a whole. It is therefore important to assess circumstances contributory to its occurrence and what measure of success attends its treatment. Such is the aim of the ensuing analysis, which refers to a nominal roll of Military O.Rs. admitted to hospital in the United Kingdom during the 12-month period August 1943—July 1944. The size of the sample was 777 of whom 50 were admitted twice. During their Army service up to July 31st 1944, some of these 777 cases had been previously hospitalized for the same complaint, and as the figures below show, the 777 individuals studied thus correspond to a grand total of 967 admissions to hospital:

Admissions per Individual	*Individuals*	*All Admissions*
1	627	627
2	118	236
3	25	75
4	6	24
5	1	5
Total	777	967

Duration of Treatment in Different Medical Units

Two striking features of wastage w.r.t. I.D.K. exposed in the ensuing table of mean days lost to service are:

(*a*) the protracted period between hospital discharge and return to unit of cases whether treated by operation or not;

(*b*) the more protracted stay of cases first treated in E.M.S. as compared with cases first treated in military hospitals (M.H.)

As regards (*b*) it is noticeable that the longer duration of hospital treatment among patients who underwent operation in E.M.S. hospitals is not associated with longer convalescence.

	Mean Stay in Days			
	Without Operation (35·4%)		*With Operation* (64·6%)	
	E.M.S.	*M.H.*	*E.M.S.*	*M.H.*
Hospital	31·2	18·4	61·6	42·9
Con. Home (*if sent*)....	28·9	32·7	39·7	42·1
Con. Depot (*if sent*)....	43·7	40·9	51·2	51·1
Total Duration	54·7	29·7	120·5	104·8

Owing to incompleteness of information and to the fact that all patients do not necessarily go through Convalescent Homes and Depots, these figures are calculated from all records with reliable data. So the individual items in each series are not necessarily based on the same cases or the same number of cases. Comparison of the two types of hospital discloses a discrepancy w.r.t. length of stay in hospital and total duration of absence from duty of men treated without operation. As regards the former, the difference between patients in E.M.S. and patients in Military Hospitals is 12·8 days. As regards the latter the difference is 25 days. Duration of stay in Convalescent Homes and Depots is approximately equal for both classes of patients. The discrepancy is due to transference of fewer cases from Military Hospitals to the Y-list and hence fewer to Convalescent Depots. This is demonstrable by contrasting: (*a*) mean duration of stay in the two types of hospital (*Military* 18·4 days, *E.M.S.* 31·2 days); (*b*) the proportion of patients respectively sent from each type of hospital to Convalescent Depots (*Military* 13·8%, *E.M.S.* 42·3%). Longer stay in E.M.S. Hospitals might also be attributable in part to delay of operation or longer conservative treatment in E.M.S. as compared with Military Hospitals, of which a greater proportion have out-patient departments for preliminary examination and surveillance. The figures shown do not conspicuously confirm this supposition with reference to cases subjected to operation.

Days in Hospital before operation	*Mean days per case* *E.M.S.* (286)	*M.H.* (176)
21 or less	7·1 (237)	6·3 (148)
Over 21	48·4 (49)	39·2 (28)

Nature of the Original Trauma

Information w.r.t. origin of the condition was available in the case notes of 470 patients, as given below:

Football	57·2
Jumping down	5·7
P.T.	4·9
Fall	4·5
Field exercise	2·8
Motor-cycling	2·3
Rugby football	2·1
Parachuting	0·9
Other	19·6
Total	100·0

Among the above, football is the only outstanding item; but if it were possible to relate the several items to the relevant sub-populations exposed to the specified risk, it would almost certainly be true that jumping from trucks is a contributory circumstance disproportionately large *vis a vis* its avoidability.

Relation of Incidence to Age

Age-incidence distributions for *discharges* w.r.t. I.D.K. have been cited in Part VI §1, and exhibit no notable trend. For *all* cases treated in the United Kingdom including both those that are of such gravity as the foregoing and the far larger proportion yielding to treatment, the appropriate distribution is as follows:

Age	<22	22–24	25–27	28–30	31–33	34–36	37–39	>39
Relative Incidence	11·3	13·7	13·5	15·8	15·4	13·9	11·2	5·2
No. of cases	106	129	122	139	123	82	50	23

The figures shown above refer to the age of first hospitalization in the Army, and to that extent need not tally closely with the date of the original trauma. The drop in the oldest age group here shown may not be significant owing to the small number of cases involved, though it is clear that the risk of trauma is in fact less in that section of the population. With due regard to this qualification, it appears that the risk of internal derangement of the knee is not concentrated in any particular age group.

Symptomatology and Diagnosis

Expressed as percentages, the symptoms most commonly recorded were :—

Pain	34·2
Locking	33·0
Instability	19·3

In this context *locking* was presumably the expression used by the patient, and does not refer to the result of the clinical examination. Nearly a third of the patients (29·4%) also complained of swelling or fluid. Of signs *sensu stricto*, the three most commonly recorded were (as percentages of all cases):

Wasting of quadriceps	20·6
Excess antero-posterior mobility	9·1
Tenderness at joint line	35·6

The following table shows (right-hand column) in what percentage of cases wasting of the quadriceps is associated with each of the conditions specified on the left.

	Total No. of Cases	*Percentage recorded with Quadriceps Wasting*
Ruptured meniscus (including cysts and hypermobile menisci)	429	24·5
Osteoarthritis, osteochondritis and loose bodies	90	20·0
Laxity of cruciate ligaments....	118	32·2
Synovitis and haemarthrosis....	122	27·0
Quadriceps hypotonia	18	66·7

The fact that there is record of wasting w.r.t. only two-thirds of cases with a diagnosis of quadriceps hypotonia indicates that the records are defective in detail, and that other percentages shown in this table are in fact too low. In conformity with current teaching, clinical notes in this sample of A.Fs. I1220 frequently record a diagnosis of rupture of the cruciate liagments on the basis of excessive antero-posterior mobility of the knee joint. The ensuing table shows the occurrence of ruptured cruciate ligament associated with the presence or absence of excessive antero-posterior mobility among the patients who underwent operation. The difference between the two classes is barely significant, and the presence of excessive antero-posterior mobility at the knee joint would not appear to be a reliable clinical sign of cruciate ligament rupture.

	Total Patients	*Patients with Ruptured Cruciate Ligaments No.*	*%*	*Difference*
Sign present	39	4	10·3	8·1±4·9
Sign absent or un-specified	463	10	2·2	

In contradistinction to 344 cases w.r.t. which there was record of tenderness at the joint line, notes on 40 patients explicitly stated that this sign was absent. Of these 40, 13 submitted to operation and 8 of them had rupture of the medial or lateral meniscus. Of the 344 cases with tenderness at the joint line 248 received operative treatment. A normal meniscus was associated with 6·1% of these cases. The following table shows the incidence of tenderness associated with condition of the meniscus as specified :

	Total No. of Cases	*Percentage with record of tenderness at joint line*
Ruptured meniscus	415	50·4
Hypermobile *ditto*	14	64·3
Normal *ditto*	23	65·2
Loose bodies	29	69·0

The following table shows (as percentages) how these major signs appear separately or jointly in the records examined.

A.	Quadriceps Wastage *alone*	7·1
B.	Excessive antero-posterior mobility *alone*	3·0
C.	Tenderness at joint line *alone*	21·0
D.	A and B together without C	2·4
E.	A and C together without B	8·9
F.	B and C together without A	1·1
G.	All three signs present	1·0

Presumably cases were seen as outpatients before hospitalization and had undergone X-ray examination at that stage, so it is not surprising that under 40% of A.Fs. I1220 record findings of radiological examination. Of the 376 cases w.r.t. which this document does record the result of X-ray examination that of 76·9% was negative. For the whole series of 967 cases a record of air arthrography is available for 6 only.

A detailed analysis of this entire sample shows that a specific diagnosis was recorded for 66% as shown below. They may be cited singly or in combination, synovitis being in all cases a single specification. The diagnosis of ruptured meniscus or cruciate ligament is here admitted only if confirmed at operation. With respect to one case cited as having the meniscus ruptured, the operation finding was explicitly normal.

	Percentage of all (967) *Cases*
Ruptured Meniscus	42·9
Cyst of *ditto*	0·9
Ruptured cruciate ligament....	1·4
Osteoarthritis	4·1
Osteochondritis	2·2
Loose bodies	3·0
Acute Synovitis	9·1
Recurrent *ditto*	1·4
Haemarthrosis....	2·1
Quadriceps hypotonia	1·9
Unspecified	34·0

Treatment

Of the entire sample (777 men) 64·6% submitted to operation, and 3·2% refused operative treatment recommended. Among circumstances which determined selection of patients for operative treatment, two worthy of comment are : (*a*) result of examination under anaesthetic ; (*b*) a protracted period of local disability. Of 175 individuals known to be examined under anaesthetic 46·9% were judged to require operation and 41·8% actually submitted to it. The remainder (5·1%) refused to do so. Among those of whom we have no record of examination under anaesthetic the percentage of individuals who underwent operation was 71·3%. As regards (*b*), the

length of history of knee derangement was recorded for 558 individuals on first admission to hospital during Army Service. The proportion undergoing operation increases with length of history as seen from the following:

Previous History (Months)	*No. of Patients*	*Percentage Operations*	*Difference*
Less than 6	239	$52 \cdot 7 \pm 3 \cdot 2$	$13 \cdot 4 \pm 4 \cdot 2$
6 and over	319	$66 \cdot 1 \pm 2 \cdot 6$	

Of statistical indications w.r.t. success of treatment three call for special comment: (*a*) indications of previous operation; (*b*) discharge from the service on medical grounds; (*c*) change of medical category. As regards (*a*) it is noteworthy that only 14 out of 500 menisci removed were remnants (11 posterior horns and 3 rims) of previous meniscectomies. Though I.D.K. is a major source of man-days lost to service it does not in fact make a considerable contribution to total wastage, *i.e.* discharge under category E, and such was the disposal of only 1·8% of the sample dealt with. Change of medical category (if stated) of cases treated or not treated surgically might thus be regarded as the most instructive indication of efficacy at our disposal; and such information is available only w.r.t. the patient at the time of admission to hospital and discharge from hospital or convalescent depot. The following table refers to cases w.r.t. which we have information concerning medical category both at admission and on discharge.

	WITHOUT OPERATIVE TREATMENT		*WITH OPERATIVE TREATMENT*	
	No. of Cases	*% without lowering of medical category*	*No. of Cases*	*% without lowering of medical category*
E.M.S.	32	$53 \cdot 1 \pm 8 \cdot 8$	77	$52 \cdot 0 \pm 5 \cdot 7$
Military Hospital	30	$70 \cdot 0 \pm 8 \cdot 4$	29	$44 \cdot 8 \pm 9 \cdot 2$
All	62	$61 \cdot 3 \pm 6 \cdot 2$	106	$50 \cdot 0 \pm 4 \cdot 9$

None of the differences recorded in this table is significant. Accordingly, there is no indication that conservative treatment has a bad prognosis, but this may merely be attributable to the fact that cases not recommended for surgical treatment were the less severe ones.

There were no deaths in this series. Information w.r.t. complications is sparse and probably unreliable. There was no mention of the presence or absence of complications in 46% of the operated cases, and pneumonia, bronchitis, etc., following operation were notable by their complete absence. Complications, singly or together, were recorded as follows:

Immediate Complications (16·6% of all operated cases)		*More remote Complications* (4·2% of all operated cases)	
Fluid in joint	81	Arthritis	6
Sepsis—intra articular	6	Limitation of Movement	6
extra articular	1		
Pyrexia of Undetermined Origin	1	Instability	7
		Recurrent swelling	3
Pulmonary Embolus (21st day)	1	Quadriceps Hypotonia	2
		Pain	1
Haematuria (14th day)	1	Oedema of the leg....	1

Summary

The following conclusions emerge from the data set forth in this section:

(*a*) I.D.K. is a major source of wastage, mainly because of the high proportion of cases treated surgically and the long duration of treatment whether operative or conservative.

(*b*) In terms of medical category, the prognosis for cases selected for one or other type of treatment differs little, the proportion of those whose medical category remains unchanged being about 50%.

(*c*) Of circumstances contributory to the trauma, football is by far the most important, accounting for over 50% of cases in the Army.

(*d*) There is no conspicuous trend with respect to the relation of incidence to age at which hospitalization is necessary in the Army population.

(*e*) Of itself, excessive antero-posterior movement at the knee joint is not a reliable sign of rupture of the cruciate ligaments.

(*f*) Of patients who underwent sub-total meniscectomy in the series under review, a trivial proportion required subsequent arthrotomy on account of symptoms attributable to meniscal remnants. Consequently, the data appear to justify the practice of subtotal meniscectomy.

§5 JAUNDICE ASSOCIATED WITH SYPHILIS TREATMENT AND WITH BLOOD TRANSFUSION

AVAILABLE statistics w.r.t. *Infective Hepatitis* add little to data presented elsewhere (Parts II-IV). Hence it is not profitable to include a section on epidemic jaundice in this context. An outstanding medical enigma of the war of 1939-45 was the high proportion of cases of jaundice associated with treatment of syphilitics. Reliable figures for the first two years are not available; but such data as we have show that about 1 in 2 syphilitics under long term arsenotherapy in the first half of 1943 developed jaundice during its course. Its occurrence, though rarely before recorded on such a scale, is a complication well-known since the introduction of arsenical treatment in 1910; and one until recently regarded as a manifestation of the toxic action of the drug. By mid-1943 evidence suggesting that this was largely the result of infection from contaminated syringes employed for intravenous injections led to the issue of instructions in the fall of that year to promote more careful sterilization. By then individual treatment centres had already begun to act accordingly; but shortage of instruments, etc., delayed full implementation of the prescribed procedure for some months.

The source of the ensuing examination of documentary materials relevant to still disputed issues has been the general medical file and Central Syphilis Register of A.Fs. 1220 from which it has been possible to trace over a minimum period of one year the relevant individual records of patients identified by means of nominal rolls from the Hollerith file of syphilitics. The sample was made up of: (*a*) United Kingdom cases 1943-44; (*b*) a smaller group of Overseas cases treated with penicillin in the latter part of 1944 alone. It will be convenient to present the results of the enquiry separately with respect to the three main treatments in use, viz.: long-term arsenic (L.T.A.), short-term arsenic (S.T.A.) and penicillin (PEN). Cases treated with the first of these make up a large bulk of the total sample. Consequently, they supply the greater part of the evidence relevant to the issues investigated:

(i) how far the incidence of jaundice in syphilitic treatment before and after mid-1943 confirm expectations implicit in new instructions promulgated at that time;

(ii) on the assumption that a syringe-spread icterogenic agent is mainly responsible for jaundice among syphilitics, how far liability to its characteristic manifestation depends *also* on:

(*a*) the nature and quantity of drugs employed in treatment;

(*b*) the concomitant presence of the syphilitic organism, or more generally the syphilitic process;

(iii) in conformity with the same assumption, is the icterogenic agent identical with the virus of infective hepatitis.

In any investigation of the statistics of disease it is necessary to examine the role of certain variables which may distort impressions gained from crude figures. An outstanding one is age. Here it suffices to say what is more fully set forth w.r.t. data cited below. That is to say, age within the range relevant to our series, does not appreciably affect liability to jaundice during syphilis treatment.

Declining Incidence of Jaundice

The following figures based on 1,955 L.T.A. cases show that the percentage incidence of jaundice among L.T.A. cases underwent a spectacular decline foreshadowed in the second half of 1943, i.e. after introduction of new instructions (June 1943) w.r.t. sterilization of syringes:

1943	First half	$45 \cdot 1 \pm 1 \cdot 9$
	Second half	$39 \cdot 8 \pm 1 \cdot 9$
1944	First half	$20 \cdot 6 \pm 1 \cdot 8$
	Second half	$5 \cdot 4 \pm 2 \cdot 0$
	Whole period	$34 \cdot 4 \pm 1 \cdot 1$

Since the view stated above was already gaining ground, it is instructive to break down the L.T.A. sample by the individual centres at which patients started treatment (Tables 217-218). The distribution of cases w.r.t. time of onset in Table 219 shows that about one third of jaundice cases occurred before a patient could have started a second course of treatment; and since the data point to long period of incubation the infective hypothesis implies that the overwhelming majority of cases became infected before starting a second course in a centre other than the one at which they first received treatment. Two features of Table 217 are worthy of comment *vis-a-vis* the issue stated in (i) above:—

(*a*) the incidence was universally high in the first half of 1943;

(*b*) thereafter decline was conspicuously unequal.

In view of evidence w.r.t. the mean incubation period set out later we may consider cases of jaundice occurring less than 150 days after beginning of treatment as due to infection in the first treatment centre. Table 218 which refers only to such cases emphasizes the two conclusions stated above.

Comparable figures for S.T.A. cases are too few to be worthy of discussion in this context; but scrutiny of the penicillin cases discloses a noteworthy feature. These included a United Kingdom group of 290 and an overseas sample of 124. The incidence of jaundice among them (August 1944—February 1945) was as follows:

U.K.	$2 \cdot 0 \pm 0 \cdot 9$
Overseas	$20 \cdot 2 \pm 3 \cdot 6$

This striking difference with respect to the use of one and the same drug is not entirely unequivocal, since the difference may conceivably be at least in part attributable to the general health of the patients. None the less, it receives a partial explanation in conformity with the view that jaundice in syphilitics under treatment can be propagated by insufficient care w.r.t. sterilization of instruments. On the other hand the figure for the overseas cases is still somewhat surprising when placed side by side with jaundice rates (page 263) among overseas casualties who either received *systemic* penicillin and/or had blood transfusions.

We have to assume that a fairly high proportion of the syphilitic population was infected with the icterogenic agent during the peak period of incidence at the beginning. In such circumstances the probability of infection at an early stage of treatment was high, and this sufficiently explains the high concentration of cases whose time of onset was in the zone between 75 and 135 days from the beginning of the first course. By the same token we might expect to find a much greater spread towards the upper limit of the time of onset as the gross incidence of jaundice declined with concomitant proportionate reduction of carriers. In fact the figures in Table 219 provide evidence that susceptibility to the infective agent is maximal at the beginning of treatment, being dependent on the syphilitic process.

From another viewpoint discrepancies between rates of decline at individual clinics as shown in Tables 217 and 218 are less arresting than similarities w.r.t. the initial

level. The high incidence of jaundice among syphilitics at the beginning of 1943 is in striking contrast to the known incidence of jaundice among patients treated with pooled homologous sera at that time. Evidence from this source indicates that the proportion of persons with infected blood in the general population is low, and all persons do not normally respond to blood-borne infective agents capable of evoking icterus. This is not what the high figures for jaundiced syphilitics at the beginning of 1943 might lead us to suppose, if we accept the hypothesis that such jaundice is in fact determined by an agent spread by syringes contaminated with blood of infected individuals. Among others, two explanations for these anomalies suggest themselves:

(*a*) that the procedure of Army V.D. clinics before 1943 constituted a selective machinery for the build up of a population isolate with an inordinately high proportion of infected donors and/or a stock of instruments more or less permanently contaminated with the icteric agent;

(*b*) that circumstances peculiar to the treatment of syphilis and/or to the syphilitic process itself favour high susceptibility to such blood-borne infective agents as may evoke icterus in appropriate circumstances.

The second issue is the theme of the section which follows. Of the first it here suffices to remark that acceptance of such a hypothesis might encourage the expectation of greater initial variation among individual clinics than figures in Tables 217 and 218 do indeed disclose.

In any case, the assumption that a V.D. clinic constitutes a population isolate *sui generis* in virtue of procedure favourable to the spread of a putative infective agent of jaundice implies the existence within such a population isolate of a high incidence of any other communicable disease which can be transmitted through blood as a medium. Evidence w.r.t. incidence of bloodborne icteric agents in the population at large is not lacking; and comparison of the incidence of jaundice after transfusion with whole blood from individual donors and with pooled plasma (page 263) entitles us to put the upper limit at a figure which is not high in comparison with that of such virus diseases as Rubella. It is therefore pertinent to put the following question: what was the incidence of known communicable, more especially virus diseases in the syphilitic population when the incidence of jaundice putatively attributable to a syringe-spread infection was at its peak level in the neighbourhood of 45%? The ensuing table which shows actual numbers of cases in the syphilitic population (United Kingdom, 1943-44) supplies a sufficient answer:—

	Total Population of Syphilitics	*Jaundice*	*Rubella*	*Chicken-pox*	*Glandular Fever*	*Herpes facialis*	*Herpes zoster*	*Pneumonia (all forms)*
1943	1,320	562	2	1	1	2	1	2
1944	635	111	0	0	0	2	0	1
TOTAL	1,955	673	2	1	1	4	1	3

Relation of Therapy to Incidence

How far the nature and quantity of the drug and how far the syphilitic process are respectively among contributory circumstances propitious to icteric manifestations are issues which we can disentangle only by a simultaneous breakdown of our data w.r.t. both. In comparing results of different therapies we shall therefore split our cases w.r.t. the progress of the disease. Valid interpretation of data bearing on either of the issues involved presupposes due consideration of the distribution of cases by date of starting treatment; but it would be unduly prolix to present all the ensuing data separately for comparable periods. Such data w.r.t. long term arsenotherapy throughout the whole period as appear below are consistent with data classified separately for three-monthly periods, and similar remarks apply *mutatis mutandis* to other comparisons below, unless there is a statement to the contrary.

The figures below exhibit no statistically significant differences w.r.t. the incidence of jaundice among patients respectively receiving long-term neoarsphenamine and mapharside at the same stage of the disease when treatment started. Rates for patients receiving short-term arsenotherapy and penicillin are not comparable, since these treatments came into use only at the end of the period to which the table refers.

Incidence (%) of Jaundice in relation to nature of Arsenical drug employed for first course and stage of Syphilis at which treatment began

Stage of Disease	*N.A.B.* (1,010 cases)	*Mapharside* (209 *cases*)
Primary Unspecified	$44 \cdot 9 \pm 6 \cdot 0$	$35 \cdot 7 \pm 13 \cdot 3$
Primary Sero-negative	$35 \cdot 4 \pm 2 \cdot 9$	$34 \cdot 7 \pm 6 \cdot 8$
Primary Sero-positive	$39 \cdot 6 \pm 2 \cdot 5$	$44 \cdot 7 \pm 5 \cdot 4$
Secondary	$26 \cdot 9 \pm 2 \cdot 6$	$36 \cdot 1 \pm 6 \cdot 1$

There is a striking contrast between the liability of syphilis patients to jaundice and to indisputably toxic effects of arsenicals *per se*. The following rates based on the United Kingdom sample of this enquiry show that rates for arsenical dermatitis, by far the most common complication of arsenotherapy other than hepatitis, remained constant while the incidence of jaundice underwent a spectacular decline.

		% Jaundice	*% Dermatitis*
1943	First half	$45 \cdot 1 \pm 1 \cdot 9$	$6 \cdot 6 \pm 3 \cdot 0$
	Second half	$39 \cdot 8 \pm 1 \cdot 9$	$6 \cdot 2 \pm 3 \cdot 0$
1944	First half	$20 \cdot 6 \pm 1 \cdot 8$	$7 \cdot 5 \pm 3 \cdot 6$
	Second half	$5 \cdot 4 \pm 2 \cdot 0$	$8 \cdot 5 \pm 7 \cdot 7$

Significance of the Syphilitic Process

We have now to ask whether the *syphilitic process* as such plays a significant contributory role. In this context the syphilitic process signifies any relevant conditions arising from the disease itself. Table 220 brings out a striking difference which suggests an affirmative answer to the question stated last. The contrast is more explicit if we condense information therein w.r.t. jaundice incidence as follows:

	Primary Stage	*Secondary Stage*	*All Stages*
January–June 1943	$48 \cdot 0 \pm 2 \cdot 3$	$36 \cdot 8 \pm 3 \cdot 5$	$45 \cdot 1 \pm 1 \cdot 9$
July–December 1943	$41 \cdot 8 \pm 2 \cdot 3$	$33 \cdot 1 \pm 4 \cdot 0$	$39 \cdot 8 \pm 1 \cdot 9$
January–July 1944	$19 \cdot 4 \pm 1 \cdot 9$	$12 \cdot 6 \pm 2 \cdot 4$	$17 \cdot 5 \pm 1 \cdot 5$

We have here definite evidence for the view that the syphilitic process does play a significant contributory role in the phenomenon under discussion. For reasons already stated, this receives support from the kind of rates shown

in Table 219. It is also sustained by the appreciable incidence of jaundice among syphilitic patients treated with pencillin. For penicillin is not of itself an agency contributory to jaundice. Among 296 cases of gonorrhoea treated with intramuscular penicillin in United Kingdom clinics from July 1944 to September 1945 no single individual had developed jaundice by the end of 1945. We have other evidence for the view that penicillin does not increase liability to jaundice. Examination of the contents of Table 225 referring to jaundice among battle casualties treated with or without systemic penicillin discloses the following rates:

With transfusion and systemic penicillin (B.L.A.)	4·3 ±0·8
Ditto, without systemic penicillin (C.M.F.)	4·2 ±1·7
Without transfusion with systemic penicillin (B.L.A.)	0·35±0·1
Ditto, without systemic penicillin (C.M.F.)	0·89±0·4

Nature of the Infective Agent

A previous table recording concomitant incidence of such other communicable diseases as occurred in a highly heterogeneous syphilitic population with a high incidence of hepatitis shows that the putative infective agent *either* stays longer in the blood stream *or* is vastly more resistant to sterilization procedures than the agent of any common communicable disease. If it is infective hepatitis, the virus of infective hepatitis must itself be very different in one or both ways from other viruses; but it is more probable that the jaundice in syphilis is evoked by an infective agent which is *not* the virus of infective hepatitis. Striking evidence of one type for this conclusion has emerged in studies on the relation of age to incidence of diseases in Part VI. Infective hepatitis like other communicable diseases which confer immunity is relatively more common in the younger age groups. The incidence of so-called postarsphenamine jaundice is much the same in all age groups of the Army population of syphilitics. The data of this sample (1943-44, United Kingdom) confirm that conclusion, as appears from the following rates, none of which significantly differ from the overall value of 34·4±1·1.

Age	*% incidence*
18—20	35·2±4·0
21—25	36·1±2·0
26—30	33·5±2·0
31—35	32·6±2·5
36—40	37·9±3·5
Over 40	29·9±4·1

These figures refer to L.T.A. and the overseas penicillin sample is confirmatory in so far as the incidence in the age groups up to and over 25 are respectively 20·6±6·4 and 19·5±4·4. For reasons stated elsewhere this suggests that the putative infective agent of postarsphenamine jaundice does not evoke appreciable immunity to subsequent infection, as does the virus of infective hepatitis. It is therefore instructive to seek further information concerning the prophylactic effect of a previous attack of infective hepatitis. Our records provided only 10 sample cases of syphilitics with a previous history of the disease. Of these 2 had jaundice during treatment in V.D. clinic. The incidence 20·0±13·3 does not significantly differ from the overall figure 34·4±1·1 for the same period. The corresponding figures for 35 and 837 cases respectively with and without previous history of infective hepatitis were 34·3±8·1 and 36·3±1·7.

An issue w.r.t. which our data provide a basis for more satisfactory comparison between the two types of jaundice is the period of incubation. Table 219 sets forth the case distribution for L.T.A. patients by time of onset from start of treatment. Neither the stage of the disease at start of L.T.A. treatment (Table 221) nor the age of the patient (Table 222) appear to affect the time of onset. The data suggest a mean period of incubation long in comparison with infective hepatitis, but of themselves do not entitle us to set clear-cut limits to it. Additional information is obtainable by recourse to corresponding data pertaining to patients treated by intensive methods, i.e. STA and PEN. Table 223 sets these out for a follow-up of six months with corresponding data for transfusion jaundice Tr.J (B.L.A.).

Although the figures are small they consistently point to a mean period of incubation in the neighbourhood of 100 days. We have to bear in mind that they are not strictly comparable in so far as the date of exposure to the putative infective agent is defined within limits of 1 day for Tr.J. cases, 9 days for PEN and 20 days for S.T.A. The real incubation period for any case may fall short of the date of onset from start of treatment by these numbers. It is profitable to set forth percentages of cases by date of onset in Table 223 more compactly thus:

	Under 40 days	40-79 *days*	80-119 *days*	120-159 *days*	160 *and over*	*TOTAL*
S.T.A.	7·1	14·2	42·9	35·7	0	100·0
PEN.	3·7	11·1	59·2	18·5	7·4	100·0
Tr.J.	15·4	30·8	38·5	15·4	0	100·0
All	7·5	16·7	50·0	22·2	3·7	100·0

The incubation period of infective hepatitis we now know to be 20-40 days. For what we may here collectively call serum hepatitis about 75% of cases occur 80 days or more after exposure and 50% occur within the range 80-120 days. Allowance for the margin of error in fixing the exact date of exposure does not materially distort these estimates. The contrast is all the more remarkable if we pay regard to the two modes of transmission. If the infective and serum hepatitis are attributable to the same virus, there is *prima facie* reason to expect that the incubation of the former would be longer, since the infective agent has to penetrate the site of the infection before it can establish itself elsewhere. The collective weight of evidence set forth here is therefore heavily against the view that the virus of infective hepatitis is responsible for serum, including so-called postarsphenamine jaundice.

Jaundice Following Blood Transfusion

Of itself jaundice following blood transfusion is not entitled to rank as a major source of wastage. It takes its proper place in this setting as one facet of the larger problem of what we may call *serum hepatitis*, including so-called *toxic* jaundice of syphilis treatment and jaundice following inoculation with homologous sera.

In 1942, 28,000 cases of jaundice occurred in American troops who had been inoculated with yellow fever vaccine containing pooled human serum as a component. The outbreak appeared to be homologous serum jaundice, and no further outbreak occurred after change of the manufacture of the vaccine to exclude human serum. The Ministry of Health (1943) summarized findings in previous outbreaks of homologous serum jaundice and drew attention to the danger of blood transfusion. Beeson (1943) and Steiner (1943) reported cases of jaundice occurring in patients who had been transfused one to four months previously. Since transfusion and jaundice have both been relatively common events during the recent war, their papers were more valuable as a stimulus to research than as a demonstration of the *magnitude* of the risk attending transfusion. Morgan and Williamson (1943)

reported nine cases of jaundice among a group of 50 patients transfused with pooled human plasma or serum. A notable feature of all these examples has been the prolonged incubation period, usually between 40 and 120 days.

Records relating to jaundice following blood transfusion were traced in the Central File of medical documents by recourse to nominal rolls of approximately 1,500 military patients with transfusion treatment in F.T.Us. during the Normandy campaign from June—November 1944. Details of the amount and nature of the transfusion (*i.e. whole* blood or *plasma*) were included on the nominal rolls. All cases were first classified as: (*a*) *Dead,* (*b*) *Effectives,* (*c*) *Discharged,* with appropriate dates. Case records of all men who were effective at the time of the inquiry (September 1945 onwards) and of discharged men were then examined in detail. Details of transfusion were also checked and additional transfusions after evacuation to the United Kingdom were noted. Cases without complete medical documents from admission to a medical unit until final discharge from hospital or Convalescent Depot were rejected. Three classes of patient were satisfactory for follow-up over a minimum period of six months after transfusion:

A. Effectives.

B. Discharged from the Army; more than 6 months' stay in hospital.

C. Discharged from the Army; stay in hospital less than 6 months but not discharged until more than 6 months after transfusion.

Criteria applied to ensure satisfactory follow-up for a minimum period of 6 months, eliminated large numbers of patients. 462 were left. Table 224 shows the incidence of jaundice in this series with due regard to nature of transfusion and type of patient as specified. Two issues emerge from a consideration of Table 224:

(*a*) the consistent findings in Groups A, B and C entitle us to treat the three as a homogeneous sample;

(*b*) transfusion with plasma *either* alone *or* in combination with whole blood leads to a higher incidence of subsequent jaundice than transfusion with whole blood alone.

This is more easy to demonstrate by condensing the same data, as follows:

	No. of Patients	*% developing Jaundice*	*Difference*
Whole Blood only	248	$0{\cdot}81 \pm 0{\cdot}57$	$4{\cdot}33 \pm 1{\cdot}61$
Plasma alone or with Blood	214	$5{\cdot}14 \pm 1{\cdot}51$	

Thus we may safely conclude that pooled plasma is more icterogenic than whole blood. On the basis of previous work on homologous serum jaundice a sufficient explanation follows from consideration of the following circumstances:—

(*a*) one bottle of whole blood is made from blood supplied by a single donor;

(*b*) Since plasma comes from large pools of blood from many donors, an icterogenic agent in the blood of a single contributor could contaminate up to 500 bottles.

No clear-cut answer emerges from a study of the incidence of jaundice in relation to the number of bottles of blood or plasma given. This is not surprising in the circumstances discussed. The *incubation* period varied widely, from 15 days to 145 days after transfusion; but over half the cases of jaundice, 8 out of 13, occurred between 60 and 120 days after transfusion. The cases are not sufficiently numerous to delimit the most frequent incubation period more precisely.

Interpretation of data w.r.t. either incidence of jaundice or its incubation period calls for scrutiny in view of clinical features common to homologous serum jaundice and to infective hepatitis. It was not practicable to pair off the sample discussed above with a strictly comparable control group, but records used for an enquiry into the efficacy of penicillin for war wounds supply us with information concerning the incidence of jaundice among C.M.F. and B.L.A. battle casualties (1943-44) some of whom received transfusion (unspecified w.r.t. plasma or whole blood) and others who did not do so. Relevant data of this mixed sample appear in Table 225. Three features of Table 225 merit comment:—

(*a*) the striking excessive incidence of subsequent jaundice common to both groups of patients who received transfusion;

(*b*) the higher incidence, though not statistically significant, of jaundice in the alternative class (without transfusion) of patients in C.M.F. where the incidence of infective hepatitis was higher than in B.L.A.;

(*c*) the occurrence of the few deaths in both series only among patients who received transfusion.

Although the numbers referred to in (*c*) are trivial, they prompt a *caveat* to the effect that transfusion may be responsible for a type of jaundice which is more fatal than infective hepatitis. This possibility is worthy of comment because of exclusion of deaths from the analysis of data cited in Table 224, but it does not vitiate the salient conclusion which the same data sustain. That is to say, *transfusion with pooled plasma is more icterogenic than transfusion with whole blood from single donors.* This assertion is consonant with the experience of Loutit and Maunsell (1945) who observed no jaundice after injection of plasma of 96 *single* donors.

Summary

The main conclusions which emerge from the data of this section are:

(*a*) Case records of 2,544 syphilitic patients have been analysed with reference to jaundice occurring during treatment. Most of the relevant information is derived from 1,955 patients treated in United Kingdom hospitals with long term arsenotherapy (L.T.A.) between January 1943 and December 1944.

(*b*) During the first half of 1943, the incidence of jaundice among L.T.A. cases was about 45%. Following the introduction of improved sterilization procedures, the incidence underwent a spectacular decline. This finding conforms with the view that the vast majority of cases of jaundice in syphilitics undergoing treatment are attributable to an infective agent transmitted from patient to patient by syringes employed for intravenous therapy and venepuncture for tests.

(*c*) During the period when incidence of jaundice was very high, the incidence of common communicable diseases was collectively trivial.

(*d*) Incidence of jaundice was similar among patients treated with long term mapharside and long term neo-arsphenamine. During the period when incidence of jaundice was sharply declining, the incidence of arsenical dermatitis remained constant. In addition a group of overseas patients treated with penicillin exhibited a high incidence of jaundice ($20{\cdot}2 \pm 3{\cdot}6$). Arsenicals therefore play no significant part in influencing susceptibility to jaundice.

(*e*) The incidence of jaundice among patients beginning treatment in the secondary stage of syphilis is significantly lower than that of patients starting treatment in the primary stage. The syphilitic

process therefore influences susceptibility to jaundice. Other evidence also suggests that maximum susceptibility occurs in the very early stages of syphilis.

(*f*) Relevant evidence from independent sources suggests that the icterogenic agent of jaundice in syphilitics is probably identical with that of homologous serum jaundice, but is certainly *not* that of infective hepatitis.

(*g*) A study of the incidence of jaundice following transfusion of whole blood and plasma in a group of 462 patients evacuated from B.L.A. to the United Kingdom during the period June—November 1944, over a follow-up period of six months showed:

(i) of 248 patients transfused with *whole blood* alone, 0·81% developed jaundice;

(ii) of 214 who received plasma *either* alone *or* with whole blood, 5·14% developed jaundice.

(iii) a significantly higher incidence of jaundice after plasma transfusion is explicable, since blood of a single donor with an icterogenic agent can contaminate as many as 500 bottles of plasma.

TABLE 217

Incidence (%) of Jaundice during Treatment among Patients starting L.T.A. Treatment in various V.D. Centres at Different Time-Periods

Time—Period	Gartloch	Preston	Lincoln	Colchester	Harrow Rd.	Rl. Herbert, Woolwich	Connaught	R.V.H. Netley	Others
1943 First half....	44·7 ± 7·3	54·9 ± 5·5	44·7 ± 8·1	48·8 ± 7·6	36·5 ± 6·7	22·2 ± 10·1	39·0 ± 6·3	35·9 ± 6·0	48·2 ± 3·0
Second half	28·0 ± 7·0	33·7 ± 4·8	44·6 ± 6·2	48·8 ± 8·0	51·3 ± 8·1	44·0 ± 10·1	36·7 ± 6·9	28·6 ± 7·0	41·8 ± 3·2
1944 First half	8·3 ± 8·3	14·7 ± 3·4	30·3 ± 5·7	28·3 ± 6·2	40·6 ± 8·8	20·0 ± 8·2	10·0 ± 10·0	0·0	17·4 ± 2·7
Second half	—	3·3 ± 3·2	7·1 ± 7·1	0·0	12·5 ± 12·5	0·0	—	—	6·3 ± 3·1
Whole period	33·3 ± 4·7	29·7 ± 2·6	36·6 ± 3·6	39·7 ± 4·0	40·5 ± 4·3	25·6 ± 4·8	35·6 ± 4·3	30·4 ± 4·3	35·3 ± 1·7

TABLE 218

Percentage of Patients Developing Jaundice in less than 150 Days after starting L.T.A. Treatment at various V.D. Centres

	Gartloch	Preston	Lincoln	Colchester	Harrow Rd.	Rl. Herbert, Woolwich	Connaught	R.V.H. Netley	Others
1943	28·8 ± 4·8	31·0 ± 3·5	31·1 ± 4·6	31·0 ± 5·0	30·8 ± 4·7	20·9 ± 6·3	25·0 ± 4·2	15·1 ± 3·5	33·4 ± 2·1
1944	8·3 ± 8·3	6·5 ± 2·1	18·7 ± 4·4	12·3 ± 4·3	27·5 ± 7·1	2·9 ± 2·8	0·0	0·0	9·5 ± 1·8

TABLE 219

Percentage Distribution of time of onset

Date of Initial Treatment	Days from beginning of treatment												Total	No. of Cases
	Under 46	46–75	76–105	106–135	136–165	166–195	196–225	226–255	256–285	286–315	316–345	Over 345		
1943 First half	3·0	5·3	31·8	22·5	18·2	6·3	5·3	2·3	2·3	0·7	1·0	1·3	100·0	302
Second half	2·0	4·9	25·3	25·7	17·6	8·6	6·9	1·6	3·3	0·8	0·8	2·4	100·0	245
1944 First half	1·9	2·9	27·9	24·0	15·4	11·5	4·8	2·9	1·0	4·8	0	2·9	100·0	104
Second half	14·3	0	0	28·6	14·3	14·3	0	14·3	14·3	0	0	0	100·0	7
Whole period	2·6	4·7	28·4	24·0	17·5	8·1	5·8	2·3	2·6	1·4	0·8	2·0	100·0	658

TABLE 220

Incidence (%) of Jaundice related to Stage of Syphilis at which Treatment Began

Time—Period	Primary Unspecified	Primary Sero-Negative	Primary Sero-Positive	Secondary	Sero-Positive ; Clinical signs unspecified	All Stages
1943 First half	41·1 ± 6·6	44·1 ± 3·8	52·0 ± 3·1	36·8 ± 3·5	57·1 ± 11·6	45·1 ± 1·9
Second half	50·0 ± 6·6	40·6 ± 3·8	40·7 ± 3·1	33·1 ± 4·0	28·6 ± 12·5	39·8 ± 1·9
1944 First half	22·0 ± 5·8	20·8 ± 3·6	24·0 ± 3·5	15·3 ± 2·9	33·3 ± 11·4	20·6 ± 1·8
Second half	0·0	5·9 ± 4·0	9·8 ± 4·1	0·0	0·0	5·4 ± 2·0
Whole period	37·7 ± 3·7	34·1 ± 2·1	38·9 ± 1·8	27·0 ± 1·9	37·3 ± 6·3	34·4 ± 1·1

TABLE 221

Time of onset of Jaundice in relation to Stage of Disease at which Treatment Began (L.T.A. Series)

Stage of Disease	Days after starting treatment												Total	No. of Cases
	Under 46	46–75	76–105	106–135	136–165	166–195	196–225	226–255	256–285	286–315	316–345	Over 345		
Primary Unspecified	1·6	6·5	27·4	29·0	11·3	8·1	3·2	1·6	4·8	—	—	6·5	100·0	62
Primary Negative	1·8	6·7	30·0	24·5	17·2	6·1	4·9	3·1	2·5	1·2	1·2	0·6	100·0	163
Primary Positive	2·2	3·0	26·9	21·3	20·5	9·3	6·0	2·2	3·4	2·2	0·7	2·2	100·0	268
Secondary	4·1	4·9	28·7	27·0	14·8	8·2	9·0	2·5	—	—	0·8	0·0	100·0	122
Sero Positive; Clinical signs unspecified	5·3	5·3	36·8	18·4	15·8	7·9	2·6	—	—	2·6	—	5·3	100·0	38

TABLE 222

Relation of Age to the time of onset of Jaundice (L.T.A. Series)

AGE	Days after starting treatment												Total	No. of Cases
	Under 46	46–75	76–105	106–135	136–165	166–195	196–225	226–255	256–285	286–315	316–345	Over 345		
18–25	2·3	5·5	29·7	25·8	16·0	7·8	5·1	2·3	2·0	0·8	0·8	2·0	100·0	256
26–30	2·2	3·9	26·3	26·8	18·4	7·8	3·9	2·8	2·8	2·8	0·6	1·7	100·0	179
31–35	3·4	3·4	28·4	24·1	19·0	9·5	6·9	0·9	0·9	0·9	1·7	0·9	100·0	116
36 + ...	2·8	5·6	29·0	15·0	17·8	7·5	9·3	2·8	5·6	0·9	—	3·7	100·0	107

TABLE 223

Time of onset of Jaundice

	Days after starting treatment										Total	No. of Cases
	0–19	20–39	40–59	60–79	80–99	100–119	120–139	140–159	160–179	180–199		
S.T.A.	0	7·1	7·1	7·1	28·6	14·3	28·6	7·1	0	0	100·0	14
PEN.	0	3·7	3·7	7·4	29·6	29·6	7·4	11·1	3·7	3·7	100·0	27
Tr.J	7·7	7·7	7·7	23·1	15·4	23·1	7·7	7·7	0	0	100·0	13

TABLE 224

Jaundice Following Blood Transfusion with Whole Blood and Plasma

Group of Patients	WHOLE BLOOD ONLY		WHOLE BLOOD AND PLASMA		PLASMA ALONE		TOTALS	
	No. of Patients	No. with Jaundice	No. of Patients	No. with Jaundice	No. of Patients	No. with Jaundice	No. of Patients	No. with Jaundice
A	144	1	86	3	34	3	264	7
B	68	1	44	2	17	0	129	3
C	36	—	28	2	5	1	69	3
TOTAL SERIES	248	2 (0·81%)	158	7 (4·43%)	56	4 (7·14%)	462	13 (2·81%)

A = Effectives 6 months after transfusion. B = Discharged from the Army; stay in hospital more than 6 months. C = Discharged from the Army; stay in hospital less than 6 months, but not discharged until more than 6 months after transfusion.

TABLE 225

Jaundice Following Blood Transfusion

	TRANSFUSED		NOT TRANSFUSED		% INCIDENCE OF JAUNDICE		DEATHS FROM JAUNDICE
	No. of Patients	No. with Jaundice	No. of Patients	No. with Jaundice	Transfused	Not Transfused	
British Liberation Army	616	27	1,678	6	4·3	0·35	2 Deaths from Transfused Series.
Central Mediterranean Force	141	6	674	6	4·2	0·89	1 Death from Transfused Series.

THE sources of what follows are respectively the statistical return attached to the Monthly Hygiene Report of Overseas theatres, and A.F.W3180 for Home Commands, now replaced by A.Fs. W3166-7. During the greater part of the war, statistical information available at the War Office w.r.t. the incidence of V.D. in the various theatres were grossly defective. Apart from difficulties arising in connexion with Army medical statistics in general, there were others peculiar to the group itself, notably:

(a) impossibility of checking consolidated returns against hospital records arriving at W.O. by an independent channel while a large (and locally variable) proportion of gonorrhoea cases received treatment outside hospitals documented as such;

(b) lack of uniformity with respect to diagnostic criteria employed with reference to: (a) gonorrhoea; (b) "other" V.D., *i.e.* V.D. other than syphilis and gonorrhoea.

The recognition of these deficiencies prompted revision of consolidated documents after visits of War Office representatives to the various theatres and United Kingdom commands. It is therefore possible to review the trend after cessation of hostilities.

Specification of Gonorrhoea

In preparation of consolidated returns there had previously been no uniformity of procedure with reference to the citation of figures for gonorrhoea referable to laboratory (C-G smear positive) tests and/or clinical signs; and expert estimates with respect to the proportion of urethritis cases certainly specificable as gonorrhoea on the basis of a G-C positive smear differ widely. If, as figures here shown suggest, the proportion of non-specific urethritis may be high, it goes without saying that estimates of the incidence of gonorrhoea respectively based *wholly* on clinical criteria and *also* on the result of a bacteriological test may widely diverge and comparison of figures from different sources may lead to spurious conclusions if referable to different criteria. In the tables here shown *Urethritis* (+) and *Urethritis* (—) respectively refer to urethritis associated with a positive and a negative G-C smear. A small proportion of cases for which the results of the smear test are *not reported* are distributed in the appropriate ratio between the two to make the sum equivalent to the total of recorded urethritis cases. Rates shown in the lower half of Chart 45 include under *Gonorrhoea* the sum of Urethritis (+) cases and half the Urethritis (—) cases.

Specification of Other V.D.

Under V.D. the new list of diseases on A.F. W3166 separately specified for males: syphilis, urethritis (+), urethritis (—), chancroid and lymphogranuloma. Returns received from B.L.A. and United Kingdom in 1945 continued to specify *in addition* "Other V.D." M.E.F. which had not yet brought the new form into use also specified "Other V.D." in addition to Syphilis and Gonorrhoea. Since figures attached to this item do not (or should not) include any of the foregoing; and since they contribute substantially to total V.D. cited from the same sources it is likely *either* that they refer to diseases not certainly venereal (e.g. *balanitis*), *or* that they include entries which should have been made under one of the specific headings mentioned. In the absence of more explicit information we should therefore exclude them from our total. Partly for this reason and partly because liability to chancroid and lymphogranuloma is subject to considerable geographical variation, it is more profitable to concentrate attention on the total of syphilis and gonorrhoea, *i.e.* syphilis together with urethritis (+) or syphilis together with all urethritis, here shown separately.

Trend of V.D. Rates

V.D. rates in B.A.O.R. increased four-fold from May to August 1945, but thereafter showed a slight downward trend. In C.M.F. there was a two-fold rise of V.D. from May to August. There too, the September figures suggested a check. The decline was transitory. From September onwards rates w.r.t. syphilis and *all* urethritis rose steadily until the end of the year. By December the equivalent annual rate for the sum of syphilis and *all* urethritis was over 9 per cent. In B.A.O.R. the downward trend w.r.t. *all* urethritis continued until December, the December rate being three-quarters of the peak (*August*) figure. In January and February 1946 it rose sharply again, reaching an equivalent annual level of 112 per thousand in the latter month, higher than the 1945 maximum in August. Syphilis rates suffer no such decline in the latter half of the year. They rose fairly steadily from 2 per thousand per annum in February 1945 to 16 in February 1946. The equivalent annual rate for syphilis and *all* urethritis taken together was then nearly 13%. If this rate were to continue for a year, 1 man out of every 8 would contract either syphilis or urethritis; and even if we exclude all smear —*ve* cases of urethritis, the composite equivalent annual rate during February 1946 was 11%, signifying an annual risk that one man out of every 9 would contract one or other of the two chief venereal diseases.

The most noteworthy outcome of this survey is the remarkable contrast between M.E.F. (Table 232) and the United Kingdom (Table 231) on the one hand and either C.M.F. or B.A.O.R. on the other (Table 233).

Assessment of Non-Specific Urethritis

In B.A.O.R. the incidence of smear negative cases of urethritis rose less steeply than that of smear positive, possibly because the former include, in addition to a substantial proportion of truly venereal conditions which become more prevalent *pari passu* with other V.D., a proportion of non-venereal conditions with a steady incidence. A possibility also consistent with the simultaneous but unequal rise of rates w.r.t. +*ve* and —*ve* urethritis is that a high proportion of smear —*ve* cases, though not venereal, are subject to a rising seasonal incidence in phase with the trend of rates for gonorrhoea *sensu stricto*. Unfortunately, this possibility closes the door to plausible estimation of the magnitude of the non-venereal component of smear —*ve* cases by recourse to such statistics as are available. On the other hand a rising rate of urethritis (+) associated with a steady level of urethritis (—) would not of itself imply that the overwhelming majority of smear —*ve* cases are non-venereal. A steady level could be the resultant of two components, one venereal and rising in phase with smear +*ve* cases, the other not venereal in a phase of seasonal decline.

Scabies

Since there are good reasons for believing that bed fellowship is highly propitious to the spread of scabies, it is not altogether surprising that a spectacular increase of acarine infestation accompanied a steeply rising V.D. rate in B.A.O.R. during the latter half of 1945, beginning (Chart 45) somewhat later, as due allowance for its incubation period might encourage us to surmise. From an equivalent annual rate in the neighbourhood of 4% in the first half of 1945, the incidence had risen over four-fold by the beginning of 1946. The proportionate increase of scabies infestation in the second half of 1945 therefore tallies very closely with that of V.D. in mid-1945.

TABLE 226

Relative V.D. Rates in B.A.O.R.; British Troops; February 1945—February 1946

	1945											1946	
	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Percentage of Urethritis with smear + ve	72·2	67·4	60·1	65·8	74·7	77·0	78·2	82·1	83·5	85·4	87·0	85·3	82·7
Percentage of Urethritis with smear — ve	27·8	32·6	39·9	34·2	25·3	23·0	21·8	17·9	16·5	14·6	13·0	14·7	17·3
Ratio of Syphilis to Urethritis (+)	0·15	0·18	0·28	0·16	0·11	0·09	0·13	0·15	0·15	0·17	0·18	0·16	0·17
Ratio of Syphilis to Urethritis (—)	0·38	0·38	0·42	0·31	0·33	0·30	0·47	0·67	0·74	0·97	1·21	0·91	0·83

TABLE 227

Incidence of V.D. and Scabies among British Troops of B.A.O.R.; M.M.Rs. per 100,000 Strength; February 1945—February 1946

	1945											1946	
	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Syphilis	19·2	23·1	30·6	24·3	34·0	51·6	89·8	98·1	93·0	98·3	102·5	111·9	133·3
Urethritis (+)	130	126	110	150	301	568	681	671	638	590	569	716	770
Urethritis (—)	50	61	73	78	102	170	190	146	126	101	85	123	161
Urethritis *all*	180	187	183	228	403	738	871	817	764	691	654	839	931
Syphilis + (U+)	149	149	141	174	335	620	771	769	731	688	672	828	903
Syphilis + (U *all*)	199	210	214	252	437	790	961	915	857	789	757	951	1,064
Scabies	416	423	352	342	297	324	542	761	1,023	1,269	1,122	1,453	1,416

TABLE 228

Relative V.D. Rates in C.M.F.; British Troops; July—December 1945

	July	August	September	October	November	December
Percentage of Urethritis with smear +ve	79·0	87·3	82·6	88·3	88·4	88·3
Percentage of Urethritis with smear —ve	21·0	12·7	17·4	11·7	11·6	11·7
Ratio of Syphilis to Urethritis (+)	0·20	0·14	0·13	0·11	0·12	0·14
Ratio of Syphilis to Urethritis (—)	0·74	0·96	0·61	0·86	0·92	1·02

TABLE 229

Incidence of V.D. in C.M.F.; British Troops; M.M.Rs. per 100,000 strength; May—December 1945

	May	June	July	August	September	October	November	December
Syphilis, early	*42*	*62*	65	73	57	60	68	83
Urethritis (+)			331	522	446	530	566	609
Urethritis (—)			88	76	94	70	74	81
Urethritis *all*	*273*	*309*	419	598	540	600	640	690
Syphilis + (U+)			396	595	503	590	634	692
Syphilis + (U *all*)	*315*	*371*	484	671	598	660	708	773

Figures for May and June come from old returns. Cases then shown as *Gonorrhoea* appear here as *Urethritis* (*all*).

TABLE 230

Relative V.D. Rates in the U.K.; British Troops; July—December 1945

	July	August	September	October	November	December
Percentage of Urethritis with smear + ve	70·0	69·3	76·2	77·3	81·1	83·3
Percentage of Urethritis with smear — ve	30·0	30·7	23·8	22·7	18·9	16·7
Ratio of Syphilis to Urethritis (+)	0·20	0·21	0·18	0·19	0·19	0·22
Ratio of Syphilis to Urethritis (—)	0·47	0·47	0·56	0·66	0·82	1·08

TABLE 231

Incidence of V.D. in the U.K.; British Troops; M.M.Rs. per 100,000 Strength; July—December 1945

	July	August	September	October	November	December
Syphilis, early	25·8	25·2	26·3	28·8	30·9	31·1
Urethritis (+)	127·4	121·9	150·5	148·8	161·0	143·3
Urethritis (—)	54·6	54·0	47·2	43·8	37·6	28·7
Urethritis *all*	182·0	175·9	197·7	192·6	198·5	172·0
Syphilis + (U +)	153·2	147·1	176·8	177·6	191·9	174·4
Syphilis + (U *all*)	207·8	201·1	224·0	221·4	229·4	203·1
Chancroid	1·3	2·0	3·5	0·7	0·5	0·8

TABLE 232

Incidence of V.D. in M.E.F.; British Troops; M.M.Rs. per 100,000 Strength; May—December 1945

	May	June	July	August	September	October	November	December
Syphilis	43	32	40	30	53	51	66	30
Gonorrhoea	123	113	133	121	137	142	96	82
Other V.D.	94	110	109	124	106	97	84	79

All these figures come from old returns. *Other V.D.* is here included, since Chancroid and Lymphogranuloma are not specified separately.

TABLE 233

Comparison of Absolute Rates in Different Theatres; British Troops; M.M.Rs. per 100,000 Strength; May—December 1945

	May	June	July	August	September	October	November	December
Syphilis:								
U.K.	*	*	26	25	26	29	31	31
M.E.F.	*43*	*32*	*40*	*30*	*53*	*51*	*66*	*30*
C.M.F.	*42*	*62*	65	73	57	60	68	83
B.A.O.R.	24	34	52	90	98	93	98	103
Urethritis (+):								
U.K.	*	*	127	122	151	149	161	143
M.E.F.	*	*	*	*	*	*	*	*
C.M.F.	*	*	331	522	446	530	566	609
B.A.O.R.	150	301	568	681	671	638	590	569
Urethritis (—):								
U.K.	*	*	55	54	47	44	38	29
M.E.F.	*	*	*	*	*	*	*	*
C.M.F.	*	*	88	76	94	70	74	81
B.A.O.R.	78	102	170	190	146	126	101	85
Urethritis (*all*):								
U.K.	*	*	182	176	198	193	199	172
M.E.F.	*123*	*113*	*133*	*121*	*137*	*142*	*96*	*82*
C.M.F.	*273*	*309*	419	598	540	600	640	690
B.A.O.R.	228	403	738	871	817	764	691	654
Syphilis and Urethritis (+):								
U.K.	*	*	153	147	177	178	192	174
M.E.F.	*	*	*	*	*	*	*	*
C.M.F.	*	*	396	595	503	590	634	692
B.A.O.R.	174	335	620	771	769	731	688	672
Syphilis and Urethritis (*all*):								
U.K.	*	*	208	201	224	221	229	203
M.E.F.	*166*	*145*	*173*	*151*	*190*	*193*	*162*	*112*
C.M.F.	*315*	*371*	484	671	598	660	708	773
B.A.O.R.	252	437	790	961	915	857	789	757

*Figures not available.

Figures in italics come from old returns; rates then shown as Gonorrhea appear here as *Urethritis (all)*.

§7 MALARIA

Introduction

IT is commonplace that malaria is one of the most common diseases in all tropical and subtropical overseas theatres. In many it is the largest single source of wastage attributable to sickness. Part X would not therefore be complete without a survey of available statistics w.r.t. this disease. The two chief sources of relevant information are: (*a*) consolidated hygiene returns and annual reports; (*b*) A.Fs. I1220 (Hospital Record Cards). The former provide information regarding absolute incidence in different theatres and show the relative contribution of malaria to all non-battle cases. They also provide data for comparison w.r.t. ethnic groups (Table 237). A.Fs. I1220 on the other hand provide material to ascertain (by sampling) mean duration of stay in hospital and to obtain a breakdown by type, of total malaria hospital admissions. At the outset, it is important to emphasize that local variations are responsible for lack of uniformity of returns submitted by different commands. Hence rates shown for different theatres in the tables that follow are not necessarily comparable. A footnote to the tables explains the major discrepancy, *viz.* whether figures relate to hospital admissions only or to all medical units. It is also necessary to point out that rates for different years are not necessarily comparable within a single theatre. Since different areas within a theatre may well be more or less propitious to the spread of malaria, a shift of troops from one area to another may result in change of overall incidence even though rates within each area remain constant. Ideally, we should compare *locality-standardized* rates which make due allowance for this. Unhappily, information necessary for computing such rates is not available. Owing to the fact that returns from certain commands did not distinguish between primary cases and relapses or re-infections and owing to the clinical difficulty of separating the two groups, ensuing tables other than 239 show primary cases, re-infections and relapses jointly.

Comments

The outstanding feature of Table 234 is a dramatic decline of malaria rates in West Africa, already noted (Part IV §1). It is not surprising that 1945 malaria rates of M.E.F. and C.M.F. are considerably lower than those of West Africa or of the Far Eastern theatres. A striking fact which emerges from figures in Table 235 is that malaria made up approximately *one-tenth* of all admissions other than battle casualties in the Mediterranean theatres during the last full year of war and *a quarter* of all admissions in West Africa and India. Figures showing mean duration of stay in hospital alone and hospital plus convalescent depot appear in Table 236. The mean time spent in hospital corresponds fairly closely in Middle East and in Italy. In West Africa stay in hospital is somewhat shorter. In all three theatres the mean stay of malaria cases is shorter than mean stay of all diseases taken together; but the difference is small. So relative *wastage* rates for malaria, though somewhat lower, are not very different from relative *morbidity* rates.

In the Middle East, the contribution of malaria to total mortality was small. Indeed, only about one out of every 1,000 cases proved fatal. In West Africa on the other hand, blackwater fever and malaria taken together accounted for no less than a half of all deaths during the period 1941-44. Owing to a steep decline of the incidence both of malaria and of blackwater fever in that theatre, it is safe to assume that the contribution of these diseases to total mortality in recent years has been very much lower. M.E.F. and C.M.F. alone provide satisfactory figures with regard to *seasonal* variation of malaria rates. Whereas maximum incidence in M.E.F. is in early autumn, the seasonal peak in C.M.F. occurs in mid-summer. With the exception of the figure cited for Indians in M.E.F., comparative rates for different ethnic groups in different theatres (Table 237) are remarkably consistent.

Table 238 shows that B.T. malaria makes up over three quarters of the malaria cases in both M.E.F. and Italy. If we may assume that the majority of *clinical* cases are in fact also B.T., this type accounts for nearly all 1944 malaria cases in the two theatres. In West Africa this is not so. M.T. malaria is the most common type. If we may take it that clinical cases in this theatre are mainly M.T. it would appear that nearly 100% of cases in West Africa are of the malignant tertian type. A breakdown by type w.r.t. primary cases and relapse/re-infections separately for each of the different ethnic groups in C.M.F. appears in Table 239. In view of uncertainty arising from difficulty of distinguishing between primary cases and relapses or re-infections, it is noteworthy—and not surprising—that: (*a*) over 90% of malaria cases were primary during the *first* full year in which British troops served in North Africa (1943); (*b*) by 1944 the proportion of primary infections was down to less than 50%. Though the difficulty of making this distinction precludes the possibility of forming a decisive estimate of the success of preventive measures w.r.t. malaria during the course of the war in theatres other than West Africa, it is at least clear that implementation of existing measures is fraught with far greater difficulties in an active than in a static theatre.

We may thus summarize the contents of Tables 234-239:

(*a*) In the last full year of war malaria made up approximately one-tenth of all admissions other than battle casualties in the Mediterranean theatres and a quarter of all admissions in West Africa and India.

(*b*) Incidence of malaria among British Troops in West Africa fell from 900 per 1,000 per annum in 1941 to 90 per 1,000 per annum in 1945.

(*c*) Difficulty of distinguishing primary cases from relapses or re-infections precludes a clear-cut estimate of the extent to which preventive methods reduced the risk of infection in other theatres.

(*d*) Whereas B.T. malaria was the most common type among British Troops in Mediterranean theatres, the M.T. type accounted for nearly all malaria cases in West Africa.

TABLE 234

Incidence of Malaria in Major Overseas Theatres; British Troops; Annual Rates per 1,000 Strength

	1941	1942	1943	1944	1945
M.E.F.[1]	20	24	26	40	22
C.M.F. (*incl.* North Africa)[2]			75	76	19
West Africa[1]	895	762	442	278	92
India[1]				230	131
Alfsea[2]					92

TABLE 235

Malaria as a Percentage of Total Admissions (excl. Battle Casualties) in Major Overseas Theatres; British Troops

	1941	1942	1943	1944	1945
M.E.F[1]	3·7	4·3	5·1	9·6	5·1
C.M.F. (*incl.* North Africa)[2]			14·2	13·2	2·6
West Africa[1]	55·2	53·1	38·2	25·2	12·1
India[1]				22·7	14·8
Alfsea[2]					11·4

[1]Admissions to Hospital. [2]Admissions to All Medical Units.

TABLE 236

Mean Duration of Stay in Hospital and Convalescent Depot w.r.t. Malaria in M.E.F., Italy and West Africa; British Army Other Ranks

	Mean Duration of Stay (in days)	
	Hospital only	Hospital and Convalescent Depot
M.E.F. 1943	17·9	24·4
1944	16·8	20·6
Italy 1944	15·9	22·2
West Africa 1943	13·1	
1944	13·2	

TABLE 237

Comparative Incidence of Malaria by Ethnic Groups, 1945

	M.E.F.	C.M.F.	W. Africa	India	Alfsea
British *Annual Rate per 1,000*....	*21·6*	*18·5*	*91·9*	*131·0*	*92·3*
„ As Standard	100	100	100	100	100
Indians	100	43		57	54
Africans	20	(33)+	36		10
New Zealanders	36	(12)+			
U.D.F.	61				

+1944 rate using British *1944* rate as standard.

TABLE 238

Relative Incidence of Types of Malaria ; Admissions to Hospital ; British Army Other Ranks ; M.E.F. Italy and West Africa, 1943 and 1944

Type of Malaria	1943		1944		
	M.E.F.	West Africa	M.E.F.	Italy	West Africa
B.T.	76·0	0·1	90·3	86·5	0·1
Q.	0·4	0·0	0·0	0·2	—
M.T.	12·6	48·7	5·0	3·3	55·7
Blackwater Fever	0·0	0·6	0·0	—	—
Clinical	11·0	50·6	4·6	10·1	44·2
Total	100·0	100·0	100·0	100·0	100·0

TABLE 239

Relative Incidence of Types of Malaria; Admissions to All Medical Units; Allied Military Forces, C.M.F., 1943—45

Type of Malaria	NORTH AFRICA		ITALY and SICILY								
	British		British		Canadians	New Zealanders	Indians		Africans	Poles	Italians
	1943	1944	1944	1945	1944	1944	1944	1945	1944	1945	1945
Primary Cases:											
B.T.	43·5	77·4	79·2	80·7	73·4	82·9	78·0	62·0	66·2	85·0	65·6
Q.	0·3	0·8	0·2	0·4	—	—	0·3	0·3	—	0·4	0·9
M.T.	16·7	9·4	3·7	4·6	2·4	0·7	8·0	20·3	17·9	5·9	16·1
Clinical	39·5	12·4	16·9	14·4	24·1	16·4	13·7	17·4	16·0	8·7	17·3
All	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Relapse/Re-infections:											
B.T.	41·4	89·3	89·6	92·9	79·4	90·6	91·1	85·6	83·6	88·2	82·5
Q.	0·8	0·3	0·1	0·2	—	—	0·8	—	—	0·5	—
M.T.	36·1	5·5	3·6	1·1	2·5	—	2·6	5·2	13·7	1·0	0·3
Clinical	21·7	4·9	6·7	5·7	18·2	9·4	5·6	9·2	2·8	10·3	17·1
All	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
All Cases:											
B.T.	43·3	83·7	84·2	88·2	74·8	84·6	84·3	74·5	72·2	87·1	81·1
Q.	0·4	0·5	0·2	0·3	—	—	0·5	0·1	—	0·5	0·1
M.T.	18·3	7·3	3·6	2·5	2·4	0·6	5·4	12·3	16·4	2·7	1·7
Clinical	38·1	8·4	12·1	9·1	22·8	14·8	9·8	13·1	11·4	9·7	17·2
All	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Primary Cases	91·9	46·9	52·2	38·9	77·2	78·1	52·1	47·2	65·4	33·1	8·8
Relapse/Re-infections	8·1	53·1	47·8	61·1	22·8	21·9	47·9	52·8	34·6	66·9	91·2
All Cases	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0

Part XI. EFFICACY OF THERAPEUTIC MEASURES

§1 MALARIA RELAPSES TREATED WITH QUININE AND QUININE SUBSTITUTES

THIS follow-up was undertaken to assess the relative therapeutic value of two courses of treatment for malaria relapses, by recourse to medical documents of individuals receiving treatments specified on nominal rolls supplied by military hospitals in the United Kingdom. The relevant directive prescribed that all cases of malaria relapse should be given one or other of the following courses without any further anti-malarial maintenance treatment:

Course I. Mepacrine 0·2 gm., with a copious draught of fluid every six hours for 48 hours then 0·1 gm. three times a day after food for ten days; total duration of course twelve days; total amount of mepacrine 4·6 gms.

Course II. Quinine in solution, grains 10, and pamaquin 10 mgms. concurrently three times a day after food for ten days; cases remain in hospital throughout treatment; pamaquin to be discontinued if cyanosis or abdominal colic appears and the course then to be completed with quinine only.

Monthly returns from May, 1944 onwards were received from some 40 military hospitals with respect to each patient treated for malaria relapse by Course I or Course II showing (with relevant comment):

Number, Rank, Name, Regiment or Corps; Theatre of Origin of Infection; Date of First Clinical Attack; Species of Malaria Parasite; Date of Last Relapse (if any); Total number of Relapses (including current case); Treatment given, *i.e.* I or II; Date of Completion of Treatment; Disposal on Completion of Treatment.

In order to allow as long a period as possible for any subsequent relapses to manifest themselves what follows refers only to the May and June returns. For some cases information was either self-contradictory or too meagre for use. Those available for analysis were as shown in the table below.

Diagnosis	*Course I*	*Course II*	*All Cases*
B.T.—			
Relapses	650	584	1,234
First Attacks	100	76	176
Total	750	660	1,410
" Clinical "	4	4	8
M.T.	7	3	10
Not Stated	11	18	29
TOTAL	772	685	1,457

Despite instruction that only cases of malaria relapse were to be treated, 176 cases of initial attacks were included. The original diagnosis of the vast majority of all cases was B.T., there being only 10 explicitly recorded as M.T., and 37 were either " clinical " or had no diagnosis recorded. Thus M.T. cases were far too few to yield valid conclusions. Analysis is therefore confined mainly to the 1,234 relapses definitely diagnosed as B.T.; but a few figures for the other cases are given below as a matter of interest. The original directive laid down no procedure for allocating cases alternately to the two courses, hence an excess of cases receiving Course I. Bias might thus have arisen from non-random allocation of cases, and this had to be investigated in the course of analysis. Fortunately, the tests described below show that differences between cases receiving the two courses were not so serious as to invalidate conclusions drawn.

To decide how far information supplied by the hospitals can be accepted at face value, medical records of about 100 cases were extracted from the files, and compared with the monthly returns. In many cases discrepancies were apparent. The hospital returns seldom gave the actual date of the first clinical attack, but only the month and year. This was quite often a month out as compared with that recorded on A.F. I1220, and not infrequently much more. Dates of last previous relapse, also usually month and year only, tallied better; but here again there were several discordant records. Disagreement was greatest with respect to number of previous relapses, especially where there had been a large number. For two reasons, however, it was unprofitable to perform the lengthy and tedious task of attempting to correct the hospital returns from individual documents: (*a*) because medical records of many cases were incomplete, or even entirely absent, *i.e.* previous malaria attacks were not treated in hospital, or the documents had not reached the War Office; and any correction of this sort would necessarily have made no substantial contribution to the accuracy of the analysis as a whole; (*b*) because such inaccuracies would presumably affect equally Course I and Course II cases; and, while distorting the absolute picture, would not affect a relative assessment. It was, therefore, decided to use the information as given on the hospital returns, with the proviso that date of last previous relapse could be regarded as fairly reliable, date of first clinical attack as less reliable, and number of previous relapses as highly suspect.

All intervals between relapses were calculated in days. Unfortunately, the directive did not ask for date of beginning of the relapse under treatment, but only that of completion of the treatment itself. The date of beginning of treatment here assigned is obtained by subtracting 12 days from the date of completion of Course I, and 10 days for Course II. The magnitude of the uncertainty arising on this account is merely a matter of a few days, being the interval between the onset of the relapse and the beginning of treatment. As regards previous attacks, for which only the month was cited, the date of the attack was taken as the fifteenth day of month. There was thus uncertainty of the order of 15 days with respect to intervals of previous relapses. On a statistical scale such errors should balance out.

Individual coding cards were prepared to show all appropriate information on the hospital return with spaces for additional information from medical records in the War Office file. For that purpose those of every man cited in the hospital returns was searched for any mention of malaria relapse subsequent to completion of treatment. The following data were recorded for each relapse so found: (*a*) date of beginning; (*b*) whether confirmed by recognition of parasite; (*c*) interval from last previous relapse; (*d*) treatment received; (*e*) total number of subsequent relapses.

The next table shows by diagnosis and treatment the number and percentage of men for whom one or more relapses were recorded subsequent to completion of Course I and Course II.

Diagnosis	COURSE I		COURSE II	
	Cases	% Relapsed	Cases	% Relapsed
B.T.—				
Relapses	650	34·0	584	10·3
First attacks..	100	29	76	5
"Clinical"	4	(50)	4	(0)
M.T.	7	(43)	3	(0)
Not stated	11	(27)	18	(11)

Among B.T. relapses (Chart 46) 221 out of 650, or 34·0%, thus relapsed on Course I; and only 60 out of 584, or 10·3%, relapsed on Course II. In a period of approximately five months, more than 3 times as many men relapsed after treatment with mepacrine alone as compared with those who received the pamaquin and quinine course. This difference is of indisputable statistical significance. The difference between the two percentages, as shown below, is more than 10 times its standard error.

	% Relapsed	Standard error
Course I	34·0	1·86
Course II	10·3	1·26
Difference	23·7	2·24

So far as they go, figures cited above suggest that the superiority of Course II over Course I also applies to first attack of B.T. malaria, to the "clinical" and unstated diagnoses, which were almost certainly mainly B.T., and, with much less justification, owing to the very small number of cases, to M.T. malaria. For B.T. first attacks, the difference between the percentages is 24, and its standard error 5·2. By accepted standards this difference is highly significant. For cases of other kinds, the percentages shown in brackets cannot be regarded as statistically significant. Nevertheless, it is noteworthy that Course II shows up better than Course I in every category.

The ensuing table, which records *recurrent* relapses, refers only to the 1,234 cases of B.T. cases. On Course I there were some cases which relapsed twice or three times, and on Course II some which relapsed twice.

Subsequent Relapses	COURSE I		COURSE II	
	No. of Cases	% of all cases	No. of Cases	% of all cases
None	429	66·0	524	89·7
1 or more	221	34·0	60	10·3
2 or more	37	5·7	4	0·7
3	4	0·6	—	—

An alternative presentation of the relevant data embodied in the last table is as follows:

Course I	Course II
Out of 650 cases 34% suffered a first relapse.	Out of 584 cases 10% suffered a first relapse.
Out of 221 first relapses 17% suffered a second relapse.	Out of 60 first relapses 7% suffered a second relapse.
Out of 37 second relapses 11% suffered a third relapse.	*No* individuals suffered a third relapse.

It is evident that figures for Course I are consistent First relapses had five months or more in which to manifest themselves. They did so in 34% of the cases at risk. Second relapses had a shorter period, namely the total available *minus* the interval to first relapse. There was accordingly a smaller incidence, namely 17%. Similarly, third relapses, with an even shorter period, show an even smaller incidence. On the other hand, the first relapse cases on Course II suffered a second relapse in only 7% of cases, as compared with 17% of cases on Course I, although as shown below, the Course II second relapses had a longer period in which to develop. The difference between the two percentages is 10, with standard error 4·1. This suggests that the effect of treatment II carries over after the first subsequent relapse, and is effective in reducing the incidence of further relapses, as indicated by data presented below.

The next table shows all cases of relapse subsequent to Course I or Course II, specifying the treatment given at the first relapse thereafter and whether any subsequent relapses were reported. Thus, of the 221 first relapses on Course I, 31 were again given Course I, and 6, or 19%, relapsed a second time; 54 were given Course II, and 3, or 6%, relapsed further; and 136 had other forms of treatment, showing a further relapse rate of 21%. It will be seen that high relapse rates (15% or over) are shown by men receiving Course I followed by Course I, Course I followed by miscellaneous treatments; and Course II followed by Course I. Low rates (less than 7%) are shown by patients on Course I followed by Course II, Course II followed by Course II, and Course II followed by other treatments. Owing to the small number of cases within the high group and within the low group, the differences are not statistically significant; but the internal consistency of the figures lends strong *prima facie* support to the suggestion that the effect of the treatments under investigation is carried beyond the first subsequent relapse for at least 5 months.

	Treatment of First Relapse after Course I			
	Course I	Course II	Others	Total
All Cases	31	54	136	221
% Subsequent Relapses	19	6	21	17

	Treatment of First Relapse after Course II			
	Course I	Course II	Others	Total
All Cases	13	17	30	60
% Subsequent Relapses	15	0	7	7

Search for subsequent relapses of the May cases took place at the latter end of December, 1944. At that time the War Office file of A.Fs. I1220 and W3118 contained no cases admitted to hospital later than September 30th, 1944, because subsequent cases were being filed under a new system. The May cases, therefore, had an average subsequent period of 4½ months for relapses to appear. The June cases were investigated in January, 1945, by which time a new file was ready. They contained cases admitted up to December, 1944, although not all December cases would have arrived and there was probably some loss of November and October cases also. It is, therefore,

important to enquire whether the difference w.r.t. periods covered made any appreciable difference to the results. This was done by dividing the cases into half-months according to date of commencement of treatment, and working out for each group the percentage relapses. The figures cited below show that there was no significant difference between the May and the June groups.

Beginning of Treatment (Course I)	No. of Cases		% Relapses
April	8	383	33·7±2·4
May	375		
June	262	267	34·5±2·1
July	5		
Difference			0·8±3·8

Chart 46 exhibits the distribution of the interval between beginning of treatment and the date of the first subsequent relapse. The vertical scale, which is the same for Courses I and II is the percentage relapses among total cases at risk. Relapses on Course I rise to a maximum during the 8th week after start of treatment, and then fall so that after about the 18th week there is only a trickle. Although there are fewer relapses on Course II the maximum occurs much earlier, in the fifth week. Indeed, if the subsequent relapses had been examined five or six weeks after beginning of treatment, it would have seemed that Course I was more effective than Course II. This caution should be borne in mind *vis-a-vis* conclusions derived from other investigations in which only a short period is allowed for relapses to appear. The effect of Course II in not only reducing relapses, but also in accelerating those that do occur, raises issues both theoretical and practical, which would probably well repay further investigation. It is fortunate that the investigation was undertaken about five months after treatment, when relapses are at a minimum and slight differences with respect to the intervening period do not make an appreciable difference to results.

In the absence of knowledge concerning the relative frequency of relapse at different intervals after any one attack, a systematic bias might arise from insufficient attention to the clinical history of the cases chosen. So it is also necessary to enquire into the distribution of intervals between previous attacks.

(*a*) *Relation between interval of previous and of subsequent attacks*—The question we here raise is whether a man is more likely to have a subsequent relapse if his last attack was recent than if it was not. A two-fold split of cases w.r.t. the length of the interval between the initial course and the last previous attack, as shown below, reveals no significant difference.

	COURSE I		
Interval to last attack	Cases	% Relapses	% Difference
Up to 150 days	247	34·8	5·9±4·3
More than 150 days	225	28·9	

	COURSE II		
Interval to last attack	Cases	% Relapses	% Difference
Up to 150 days	256	10·9	1·8±2·8
More than 150 days	198	9·1	

(*b*) *Allocation of cases by the Hospitals to Courses I and II.*—We have now to ask whether cases on Course I did in fact differ from cases on Course II w.r.t. the proportion of recent relapses among them. A slight preponderance in Course II of short previous interval cases, as shown below is of trivial statistical significance, and allowance for a difference of this sort would in any case accentuate rather than diminish the contrast between the efficacy of the two courses.

Treatment	*All Cases on Treatment*	*% Short Interval Cases*
Course I	472	52·3
Course II	454	56·4

Since the full cycle of relapse intervals covers about a year, any shorter period cannot give a complete picture of the relative efficacies of malaria therapies. Though Course II greatly reduces and modifies the time-course of the first hump in the histogram (Chart 46) it is still possible that the second hump might be increased. All that can be said with confidence at present is that II shows up much better than I over a five-month period; and it is unlikely that observation over a longer period would reverse this conclusion.

It would have been valuable to have a record of the proportion of cases in which pamaquin had to be discontinued. Unfortunately, the original directive did not specifically ask for this information. One large hospital (Shaftesbury Military Hospital) reported four cases out of 226 on Course II taken off treatment for severe abdominal pains. There were seven small hospitals which also supplied explicit information of this sort, as follows:

Course I (64 Cases) *Treatment discontinued* in three cases. Two cases (both in one hospital) because of acute gastritis. One case transferred to Course II because of severe abdominal pains. *Symptoms reported but treatment continued* in eight cases, two (in one hospital) mild jaundice, six head, throat or abdominal pains.

Course II (59 Cases) *Treatment discontinued* in three cases because of severe abdominal pains. *Pains reported* in 12 other cases.

While there is sufficient reason to believe that bias w.r.t. the clinical history of the patients selected for the two courses is not such as to invalidate the main conclusion advanced at an earlier stage, it is still necessary to emphasize another source of error which arises when the yardstick of therapeutic efficacy is a relapse rate over a considerable period. It results from a defect in the system of recording the medical history of the soldier at the time to which the records refer. If an individual dies in hospital during service his death is on record in the War Office file of A.Fs. I1220 and W3118. The file also records a death which comes within the orbit of any other medical unit,

but deaths in action are not traceable, except by recourse to the machinery of a very large number of Record Offices ; and the War Office file referred to contained no record of discharge from the service except insofar as downgrading to Category E may occur in hospital. In this context we must, therefore, be content to assume that deaths in action or releases from service were not much more frequent among individuals allocated to Course II than among cases put on Course I. For various reasons, it is most unlikely that a real difference between the relapse rates for the two courses would not have manifested itself, if it had been practicable to exclude from our sample all cases deceased or discharged in the interval between treatment and the end of the period covered by the follow-up. Still, the need for this caveat has its own moral, namely the impossibility of adapting the Army system of documentation to its highest level of usefulness in the service of army medicine unless its control is intimately linked to the machinery of statistical research directed to that end.

§2 B.T. MALARIA RELAPSES TREATED WITH PALUDRINE

THE three methods of treatment under consideration in this Section are:

A. Quinine grs. 10 and Pamaquin 10 mgms. three times a day for 10 days.
B. Paludrine (M.4888) 25 mgms. twice daily for 10 days.
C. Paludrine (M.4888) 250 mgms. twice daily for 10 days.

The clinical details of diagnosis and treatment for the ensuing follow-up were carried out by the Medical Specialist at Colchester Military Hospital (Major R. D. C. Johnstone, R.A.M.C.). He also dealt with follow-up of cases during the six months after discharge from hospital. All cases in the series were male patients admitted to the Colchester Military Hospital in the normal routine and were unselected except in so far as they were proved to have B.T. Malaria by positive blood smear. Every third patient received one and the same treatment, and consecutive patients in order of reception received different treatment. Thus no man was selected for a particular treatment because the physician considered that more suitable for him. All were treated alike in the ward; and no discrimination was permitted to allow patients to know what drugs they were being given.

Results recorded in the last section have confirmed an already recognized periodicity of relapse with a major peak in the second and a minor peak in the ninth month. To establish a high order of therapeutic efficacy for a new treatment, it would therefore be necessary to follow the history of a group of patients through a period of at least one year. On the other hand, the validation of a negative finding needs no such exacting test. That relapses occur in excessive proportions during the early months after treatment suffices to dispose of the claim that a treatment is highly efficacious. It happens that observations on the results of administration of Paludrine, by dosage and frequency specified above, during the first six months satisfy this criterion.

Follow-up was by written questionnaire and, where ambiguous replies were given, a further letter was sent to elucidate the query. Of 322 cases who received it, satisfactory information was obtained from all but five cases. Information with reference to the others left no reason to doubt whether there had been a recurrence of the disease or whether the patient had taken therapeutic or suppressive medications liable, or likely, to postpone relapse.

Analysis of the results six months after the end of treatment, as recorded below, shows that the relapse rate following the standard treatment with Quinine and Pamaquin is significantly less than the relapse rate for *either* of the two groups receiving Paludrine.

Course	*Total Cases*	% *Doubtful*	% *Relapsed*	*Differences*	
A	107	2·8	19·6±3·8		
				25·8±6·1	
B	108	0·9	45·4±4·8		29·0±6·1
				3·2±6·8	
C	107	0·9	48·6±4·8		

The relapse rate for Quinine and Pamaquin (Course A), recorded above, compares unfavourably with a rate of 10·3% after *five* months recorded in the preceding section; and therefore calls for comment. The extra month of the present follow-up can account for few additional cases; and the difference is at least in part explicable, if we pay due regard to the different methods of follow-up employed in the two enquiries. In the present series the personal questionnaire by the physician evoked a definite reply from each patient. The method of collecting material for the earlier enquiry gave a reliable comparison between the two groups of cases within the series; but provided no firm basis for *absolute* rates. Hence the results of it are not necessarily comparable with those of any other series.

With a view to assessing the effect of treatment given early or late in relation to onset of symptoms, the mean duration in days from onset of symptoms to start of treatment was determined for each Group. That of Group A was somewhat less than that of B or C, the difference being significant. Among those who received Quinine and Pamaquin, a relatively high proportion (*vide infra*) therefore received it at an early stage after the onset of the attack. This might conceivably introduce a bias into comparison of figures shown above. Accordingly, it is necessary to compare relapse rates for different time intervals between onset of symptoms and start of treatment. It is permissible to omit cases treated during the first 24 hours (one case in Group A, two in B, one in C) and certain cases w.r.t. which the time intervals are uncertain. In conformity with results of a more refined breakdown, the grosser comparison which the following figures exhibit demonstrates that Group A consistently had lower relapse rates than Groups B or C treated during a comparable period after onset of symptoms.

Relation between Relapse Rate and Time Intervals from Onset of Attack to Starting Treatment

Interval	% CASES *Course A* (102)	% CASES *Course B* (101)	% CASES *Course C* (102)	% RELAPSES *Course A*	% RELAPSES *Course B*	% RELAPSES *Course C*
25-48 hours ..	12·7	6·9	6·9	23·1	28·6	71·4
49-96 hours ..	51·0	39·6	34·3	19·2	50·0	54·3
97-144 hours ..	24·5	33·7	35·3	16·0	50·0	41·7
Over 144 hours..	11·8	19·8	23·5	16·7	35·0	45·8
	100·0	100·0	100·0			

In so far as the preceding figures suggest that there is any relation between therapeutic efficacy and what time elapses from onset of the attack to start of treatment, those specifically referable to Group A might encourage the suspicion that early treatment favours a high relapse rate. If so, the higher proportion of Group A patients treated during the first interval would bias the result towards an unduly low estimate of the relative efficacy of Quinine and Pamaquin. An alternative analysis of the same data, as shown below, reinforces this suggestion. Though the differences are not statistically significant, they point to an issue worthy of further enquiry and of consideration in the design of future therapeutic trials on anti-malarial drugs.

25- 48 hours	23·1%±12·2
49- 72 hours	21·1%± 9·6
73- 96 hours	18·2%± 6·8
97-120 hours	9·5%± 6·8

Another possible source of bias calls for comment, *i.e.*, the relation of numbers of previous attacks to the efficacy of any particular treatment. Figures w.r.t. Course A, as cited below, disclose no indication that cases with a history of four or more previous relapses are more likely to relapse after treatment than cases with a history of fewer than four previous relapses:

	No. of Cases	% *Relapses*	*Difference*
3 or fewer attacks	29	17·2	4·2±8·9
4 or more attacks	75	21·3	

While the data cited in this Section indicate that the Paludrine courses specified above are less efficacious for B.T. Malaria relapses than the yardstick treatment (Quinine-Pamaquin), it is necessary to emphasize that this conclusion is consistent with the possibility that more frequent administration of Paludrine would give results as good as the combined Quinine-Pamaquin course, or even better.

§3 PRELIMINARY ASSESSMENT OF PENICILLIN TREATMENT FOR SYPHILIS

THE use of Penicillin for Syphilis treatment in the British Army began in September, 1944. What follows is an interim note of a more comprehensive, but as yet incomplete, enquiry undertaken to compare its efficacy with that of arsenotherapy for *early* cases. Information comes from records (A.Fs. I1220) in the Central Syphilis Register referable to male O.Rs. only. Of 373 short-term arsenic (S.T.A.) cases for whom documents are available during this period, it was possible to follow up adequately 238. Records were available for 431 penicillin cases of which it was possible to follow-up 232. These constituted the short-term penicillin-treated (S.T.P.) group.

All S.T.A. cases received a 20-day course of arsenic and bismuth. The S.T.P. group received either 2,000,000 or 2,400,000 units of penicillin. Often, the actual dosage was not recorded. Results of serum tests at the beginning of treatment on the other hand were generally explicit. For all here dealt with, the quantitative Kahn reaction was available; the Wasserman for some only. Sero-positive and sero-negative in this context refer to the Kahn test. It was possible to make a fourfold split of each sample thus:

(*a*) Sero-negative primary Syphilis.
(*b*) Sero-positive primary Syphilis.
(*c*) Secondary Syphilis.
(*d*) Exact diagnosis not stated.

At the end of the six months follow-up cases are divisible into (*a*) sero-negative; (*b*) doubtful positive serum; (*c*) positive serum. We here regard a doubtful positive serum reaction as one with a positive quantitative Kahn reaction of three units or less. Relapses referred to below included five clinical relapses for which, however, positive serum reactions are recorded for the subsequent month. No case had to be rejected on the ground that the clinical finding did not tally with a serological test. Positive clinical findings with respect to cases followed up were not often recorded. The table below shows the various stages of the disease at which treatment started in cases which it was possible to follow up:

Treatment	Primary %		Secondary %	Not Stated %	Total No. of Cases
	Sero-Negative	Sero-Positive			
Intensive Arsenotherapy (S.T.A.)....	29·4	51·7	8·4±1·3	10·5	238
Intensive Penicillin (S.T.P.)	30·5	45·3	3·9±1·8	20·2	232

From this it appears that there was a somewhat larger percentage of secondary syphilitics in the S.T.A. than in the S.T.P. course. We may consider the difference (4·5%) significant, since it is just over twice its standard error (2·2%). This would tend to bias results slightly in favour of penicillin, if relapse is more common when treatment begins in the secondary stage, as preliminary analysis of a larger sample indicates. Below is a summary of serum reactions at the end of six months both of the S.T.A. and of the S.T.P. group.

Treatment	Sero-Negative	Doubtful	Sero-Positive	Total No. of Cases
S.T.A.	87·4	10·0	2·5±1·0	238
S.T.P.	85·8	6·0	8·2±1·8	232

If we take as our criterion of relapse, a positive serum reaction at the end of six months, these data suffice to give a clear-cut answer respecting the comparative merits of the two treatments. The difference with respect to relapse rates is 5·7% and its standard error is 2·1%. If we treat *doubtful* serum reactions as relapses, the percentage difference is *not* statistically significant.

The following table summarizes results for both treatment groups sub-divided into those which were primary sero-negative, primary sero-positive and secondary at the beginning of treatment. It excludes cases for which information with respect to serum test result thereat is not available.

For both groups the trend is the same, *i.e.*, cases treated later include a greater proportion of relapses; but the numbers are not large enough to ensure a high degree of precision for the individual percentages. Though individual percentage differences in the following table are for no comparable pair of high statistical significance, the percentage of relapses in the S.T.P. is consistently greater than in the S.T.A. group. We can also state with some assurance that the relapse rate depends on the stage of the disease at beginning of treatment; but we are not entitled to make a definite statement with respect to the *absolute* rate of relapse on either course, since: (*a*) figures for both groups are subject to sampling errors which are not small in comparison with the rates themselves; (*b*) figures for both groups are liable to bias, though not such as to invalidate the conclusion that relapse in the first six months after penicillin treatment is more frequent than relapse during the same period after completion of intensive arsenotherapy. If we reject *doubtful* cases from our pool of data, short-term penicillin therapy appears to have a relapse rate of about 8% at the end of six months follow-up, *i.e.*, about three times as great as that of short-term arsenic therapy.

Initial Reaction	Course	Reaction six months later			No.
		Negative	Doubtful	Positive	
Sero-negative	S.T.A.	97·2	2·8	0·0	70
	S.T.P.	90·2	5·6	4·2± 2·6	71
Sero-positive	S.T.A.	85·4	12·2	2·4± 1·4	123
	S.T.P.	82·8	6·7	10·5± 3·0	105
Secondary	S.T.A.	55·0	30·0	15·0± 8·0	20
	S.T.P.	44·4	22·2	33·3±15·0	9

The preliminary assessment recorded above is unsatisfactory in three ways. Firstly, it leaves open the possibility that the relapse rate of the S.T.A. group might overtake that of the S.T.P. group, if the follow-up were more protracted. Secondly, owing to the absence of the necessary information, it does not disclose the stage at which relapse occurred during the period of follow-up, and lastly, it does not differentiate between *failures*, *viz.*, cases which did not respond to treatment at all and *relapses*, *viz.*, cases which did initially respond but subsequently relapsed. Full details of a more comprehensive enquiry undertaken to clarify these issues and to evaluate the relative efficacy of long-term arsenotherapy are not as yet complete; but it is not too early to summarise conclusions which have been fully checked. Failure and relapse rates now available for cases of early syphilis treated with eight different therapies disclose the following conclusions:

(*a*) No failure to respond by becoming sero-negative within 4 months of completing treatment occurred among 84 primary sero-positive cases treated by long-term arsenotherapy with a mean dosage of 22 gms. N.A.B. or equivalent mean dosage of Mapharside, nor among 84 such which received a mean dosage of 14 gms., nor among 38 sero-positive cases treated by intensive (short-term) arsenotherapy. Among 163 primary sero-positive cases which received 2,400,000 units Penicillin, 2·9% failed to respond and among 41 such cases which received 4,000,000 units there were 1·6% failures. The failure rate for secondary cases treated with penicillin was also higher than that of secondary cases treated with either type of arsenotherapy; but it is not possible to cite firm figures because of the number of doubtful reactions recorded.

(*b*) After exclusion of cases which failed to respond to treatment, the cumulative monthly relapse rates were as summarised in the table below. The sign $\mp$ indicates the variation from the mean of maximum and minimum values respectively based on treating doubtful cases as relapses or otherwise. Owing to the high rate of demobilization at the time of surveillance it was not possible to follow up all cases for the full 12 months; consequently samples followed up for 12 months are smaller than those followed up for six months. Bracketed figures in the table are based on a sample of less than 30 cases. The basis of calculation of relapse rates, which was governed by the high demobilization rates prevailing at the time of the investigation, does not permit us to cite precise standard errors, but it is certain that the sampling error w.r.t. relapse rates appearing in the table is not small.

(*c*) Though the data recorded admittedly antedate recognition of the importance of the K-fraction, the results at least emphasize the need for long-term follow-up before replacing arsenotherapy by penicillin. On the other hand, it is necessary to admit the possibility that increasing the frequency and/or duration of penicillin treatment in contradistinction to the aggregate dosage might reverse the unfavourable verdict which our data compel us to record.

T

Cumulative Percentage Relapse Rates

	Time period	Pen.—2,400,000 Units	Pen.—4,000,000 Units	Pen.—2,400,000 Units; Maph.—0·6 gm.	Pen.—2,400,000 Units; Maph.—0·4 gm. Bi.—1·0 gm.	L.T.A. N.A.B. 7·0 gm.; Bi.—4·5 gm; Pen.—2,400,000 Units.	L.T.A. N.A.B.—22 gm. Bi.—9·5 gm.	L.T.A. N.A.B.—14 gm. Bi.—9·5 gm.	S.T.A. Maph.—1·3 gm. Bi.—2·0 gm.
Primary Sero-negative	6 months	11·0∓0·5	(10·8∓0·8)	14·6∓1·5	5·0∓0·0	(0·0)	0·0	0·0	0·0
	12 months	14·0∓2·4	—	(18·2∓1·5)	(9·0∓1·9)	(5·7∓0·0)	(0·0)	0·0	(0·0)
Primary Sero-positive	6 months	10·2∓0·0	(6·3∓0·0)	6·7∓0·9	(10·9∓0·0)	2·6∓0·0	0·0	0·6∓0·6	5·3∓0·0
	12 months	12·8∓0·0	—	(15·9∓4·5)	(23·3∓3·3)	(2·6∓0·0)	1·6∓0·0	3·5∓0·6	(5·3∓0·0)
Secondary	6 months	8·1∓0·5	(17·4∓0·0)	(6·6∓0·0)	(19·2∓0·0)	(8·8∓0·0)	4·1∓0·9	3·8∓1·2	5·7∓0·0
	12 months	17·5∓0·5	(25·4∓0·0)	—	—	(12·9∓4·1)	(11·4∓2·1)	(9·3∓2·8)	(10·7∓1·5)

The ∓ sign indicates the variation from the mean of maximum and minimum values respectively based on treating doubtful cases as relapses or otherwise.
Bracketed figures are based on a sample of less than 30 cases.

§4 PENICILLIN ADMINISTRATION IN WAR-TIME SURGERY

THE war provided unique opportunities for the use of penicillin in connection with traumatic surgery; and the *Penicillin Clinical Trials Sub-committee* of the War Wounds Committee of the M.R.C. rightly recognized the desirability of using the machinery of Army medical documentation to present a picture of the experience surgeons gained in the services before and after its introduction. On representation by the M.R.C., the War Office agreed to issue a yellow " PEN " label to accompany the medical documents of casualties treated with the new drug. This decision was implemented before a drastic reorganization of Army Medical Statistics to effect *inter alia* more satisfactory provision for the conduct of therapeutic trials, and, in particular, availability of all relevant medical documents of the individual soldier with that end in view. By that time, an urgent need to employ any practicable measure with a likely prospect of success in surgical treatment of battle casualties had resulted in measures which eliminated the possibility of selecting a satisfactory control group. Administration of penicillin had come into general use as a routine precaution. No contemporary comparison of comparable cases treated with and without it was therefore realisable. At best it was practicable only to compare experience of a theatre where casualties did receive such treatment with earlier experience of a theatre in which they did not. Unfortunately, complete documents relating to cases dealt with in forward units of the latter were no longer available.

It is, therefore, impossible to record results of a conclusive assessment of the efficacy of penicillin w.r.t. treatment of war wounds; but it is of some historic interest to record experience of its use. The tables accompanying this section are thus an account of one aspect of surgical practice in a situation which did not provide opportunities for ensuring the basic desiderata of a therapeutic trial. In view of the absence of full information w.r.t. deaths in forward medical units of what appears as the *control* group for lack of a more appropriate epithet, the tables could in no circumstances justify an unfavourable verdict concerning the efficacy of the drug; but the consistently low death rate from infective causes of every type of case treated by penicillin as specified in Table 240 is highly suggestive in spite of the fact that no difference with respect to a single type of wound has a statistical significance on its own account. It is also worthy of comment that infective complications following wounds of different types are consistently less frequent in the theatre which employed penicillin.

The two groups cited as the *experimental* and the *control* in the tables which follow, respectively include casualties of the Normandy campaign 1944-45 and casualties of the C.M.F. campaigns. The relevant documents are hospital record cards (A.F. I1220) and field medical cards (A.F. W3118). Before the reorganization of Army Medical Statistics was authorized by D.G.A.M.S. in 1944, the War Office had no separate code of the W3118 for reference. Hence, as stated, nominal rolls of cases treated only in forward units, *i.e.* recorded on A.F. W3118 alone, were not available w.r.t. the C.M.F. campaigns. For hospitalized casualties, data recorded on the field medical card were available with other documents traceable in the Central File. The analysis of casualties by site, severity and nature of wounds was undertaken by Mr. Alan H. Hunt, F.R.C.S., assisted by members of the War Office Medical Research Staff.

TABLE 240

Comparison of Total Death Rate for Cases receiving Penicillin with Hospital Death Rate of Other Cases

			Deaths from non-infective causes		*Deaths from infective causes*	
Site	*Treatment*	*No. of Cases*	*% Deaths*	*Difference*	*% Deaths*	*Difference*
CHEST	Penicillin	374	6·15	+2·38±1·95	3·48	— 5·95±2·57
	No Penicillin	159	3·77		9·43	
FEMUR	Penicillin	192	2·08	—0·14±2·43	3·13	—12·43±5·54
	No Penicillin	45	2·22		15·56	
TIBIA	Penicillin	209	4·31	—0·13±3·40	0·48	— 6·19±3·65
	No Penicillin	45	4·44		6·67	
HUMERUS	Penicillin	232	0·43	+0·43±0·43	—	— 9·43±4·01
	No Penicillin	53	—		9·43	
JOINTS	Penicillin	435	0·23	—2·37±1·83	0·46	— 3·44±2·23
	No Penicillin	77	2·60		3·90	
FLESH	Penicillin	555	0·72	+0·03±0·61	1·98	— 1·47±1·22
	No Penicillin	290	0·69		3·45	
ARTERIAL	Penicillin	110	11·82	+5·57±6·97	6·36	— 6·14±8·59
	No Penicillin	16	6·25		12·50	

TABLE 241

Incidence of Gas Gangrene and Anaerobic Cellulitis

Prophylactic Penicillin Experimental Group and Control Group

		Soft Tissue Damage—Mild		*Soft Tissue Damage—Severe*	
		Total Cases	%	*Total Cases*	%
FEMUR	Experimental	94	—	40	5·0
	Control	27	—	22	18·2
TIBIA	Experimental	81	—	67	3·0
	Control	28	3·2	21	9·5
HUMERUS	Experimental	100	—	52	2·0
	Control	35	5·7	22	9·1
JOINTS	Experimental	280	0·4	35	—
	Control	74	—	16	—
FLESH	Experimental	296	1·0	144	2·1
	Control	246	0·8	74	5·4
ARTERIAL	Experimental	—	—	83	4·8
	Control	—	—	15	—

TABLE 242 Prophylactic Penicillin—Complete Fractures of Femur, Tibia and Humerus

	Soft Tissue Damage		No. of Cases	Infective Complications		Specific Complications (%)			
				%	Difference	Osteomyelitis and Sequestrum	Gas Gangrene	Deep Wound Infection	Pneumonic Conditions
FEMUR: Bone Comminuted	Mild	Experimental	80	27·5	5·8±11·0	15·0	—	12·5	—
		Control	24	33·3		8·3	4·2	20·9	—
	Severe	Experimental	38	52·6	12·1±14·5	21·1	5·3	26·2	—
		Control	17	64·7		11·8	23·5	23·5	5·9
FEMUR: All Fractures	Mild	Experimental	94	27·6	5·7±10·3	13·8	—	13·8	—
		Control	27	33·3		7·4	—	25·9	—
	Severe	Experimental	40	55·0	8·6±13·2	20·0	5·0	30·0	—
		Control	22	63·6		9·1	22·7	27·3	4·5
TIBIA: Bone Comminuted	Mild	Experimental	72	33·3	12·5±11·8	19·4	—	11·1	2·8
		Control	24	45·8		25·0	—	20·8	—
	Severe	Experimental	65	38·5	4·4±12·6	20·0	3·1	15·4	—
		Control	21	42·9		19·0	14·3	9·5	—
TIBIA: All Fractures	Mild	Experimental	81	30·9	12·0±10·8	17·3	—	11·1	2·5
		Control	28	42·9		25·0	—	17·9	—
	Severe	Experimental	67	37·3	5·6±12·6	19·4	3·0	14·9	—
		Control	21	42·9		19·0	14·3	9·5	—

TABLE 242 (*contd.*)

Prophylactic Penicillin—Complete Fractures of Femur, Tibia and Humerus

	Soft Tissue Damage		No. of Cases	Infective Complications		Specific Complications (%)			
				%	Difference	Osteomyelitis and Sequestrum	Gas Gangrene	Deep Wound Infection	Pneumonic Conditions
HUMERUS: Bone Comminuted	Mild	Experimental	82	18·3	28·4±10·2	9·8	—	8·5	—
		Control	30	46·7		16·7	6·7	23·3	—
	Severe	Experimental	51	21·6	57·3±11·2	11·8	2·0	7·8	—
		Control	19	78·9		26·3	10·5	21·0	21·0
HUMERUS: All Fractures	Mild	Experimental	100	16·0	24·0± 9·2	8·0	—	8·0	—
		Control	35	40·0		14·3	5·7	20·0	—
	Severe	Experimental	52	21·1	51·6±11·2	11·5	1·9	7·7	—
		Control	22	72·7		22·7	9·1	22·7	18·2

TABLE 243

Osteomyelitis in Wounds of Long Bones

		Transverse or Oblique Fractures				Comminuted Fractures			
		Total Cases	% Osteo-myelitis and se-questrum	% Seque-strum	% Osteo-myelitis	Total Cases	% Osteo-myelitis and se-questrum	% Seques-trum	% Osteo-myelitis
FEMUR	Experimental	16	6·3	—	6·3	118	16·9	11·9	5·1
	Control	8	—	—	—	41	9·8	2·4	7·3
TIBIA	Experimental	11	—	—	—	137	19·7	16·1	3·6
	Control	4	25·0	25·0	—	45	22·2	15·6	6·6
HUMERUS	Experimental	19	—	—	—	133	10·5	9·0	1·5
	Control	8	—	—	—	49	20·4	14·3	6·1
FEMUR TIBIA HUMERUS	Experimental	46	2·2	—	2·2	388	15·7	12·4	3·4
	Control	20	5·0	5·0	—	135	17·8	11·1	6·7

TABLE 244

Incidence of Soft Tissue Infections (Excluding Gas Gangrene) by Bone Severity Grade

		Transverse or Oblique Fractures		Comminuted Fractures		
		Total cases	% Infective Complications	Total cases	% Infective Complications	Difference
FEMUR	Experimental	16	31·3	118	16·9	7·5±7
	Control	8	25·0	41	24·4	
TIBIA	Experimental	11	9·1	137	14·6	1·0±6
	Control	4	0·0	45	15·6	
HUMERUS	Experimental	19	5·3	133	8·3	22·3±7
	Control	8	12·5	49	30·6	

TABLE 245 **Incidence of Soft Tissue Infections (excluding Gas Gangrene) by Soft Tissue Severity Grades**

		Soft Tissue Damage—Mild		Soft Tissue Damage—Severe	
		Total Cases	%	Total Cases	%
FEMUR	Experimental	94	13·8	40	30·0
	Control	27	18·5	22	31·8
TIBIA	Experimental	81	13·6	67	14·9
	Control	28	17·9	21	9·5
HUMERUS	Experimental	100	8·0	52	7·7
	Control	35	20·0	22	40·9
FEMUR TIBIA HUMERUS	Experimental	275	11·6	159	16·4
	Control	90	18·9	65	27·7
JOINTS	Experimental	280	7·5	35	5·7
	Control	74	6·8	16	18·8
FLESH WOUNDS	Experimental	296	19·3	144	31·3
	Control	246	30·5	74	41·9
ARTERIAL INJURIES	Experimental	—	—	83	21·7
	Control	—	—	15	53·3

TABLE 246 **Joint Wounds—Infective Complications**

Joint Damage	Soft Tissue Damage		No. of Cases	% Infective complications	Specific Complications (%) Osteomyelitis and Sequestrum	Gas Gangrene	Deep Wound Infection	Pneumonic Conditions	Septic Arthritis
Mild	Mild	Experimental	254	9·4	1·5	—	7·1	—	0·8
		Control	72	16·7	2·8	—	8·3	1·4	4·2
	Severe	Experimental	17	5·9	5·9	—	—	—	—
		Control	6	50·0	—	—	33·3	—	16·7
Severe	Mild	Experimental	26	26·9	3·8	3·8	7·7	3·8	7·7
		Control	2	100·0	—	—	—	—	100·0
	Severe	Experimental	18	33·3	22·2	—	11·1	—	—
		Control	10	60·0	20·0	20·0	10·0	—	10·0
Mild+ Severe	Mild	Experimental	280	11·1	1·8	0·4	7·1	0·4	1·4
		Control	74	18·9	2·7	—	8·1	1·4	6·7
	Severe	Experimental	35	20·0	14·3	—	5·7	—	—
		Control	16	56·3	12·5	12·5	18·8	—	12·5

TABLE 247

Flesh Wounds—Infective Complications

Soft Tissue Damage		Total Cases	Infective Complications		Specific Complications (%)				
			%	Difference	Deep Wound Infection	Gas Gangrene	Pneumonic Conditions	Osteo-myelitis and Sequestrum	Septic Arthritis
Mild	Experimental	296	22·0	9·7±3·8	18·9	1·0	0·3	1·7	—
	Control	246	31·7		29·7	0·8	0·8	0·4	—
Severe	Experimental	144	34·0	16·0±7·0	29·9	2·1	0·7	0·7	0·7
	Control	74	50·0		40·5	5·4	1·4	2·7	—

TABLE 248

Flesh Wounds Primarily or Secondarily Sutured

Degree of Severity		Total Cases	Total Sutured		% Primarily Sutured	% Primarily Sutured—Delayed	% Secondarily Sutured
			%	Difference			
Mild	Experimental	296	45·6	16·8±3·8	3·4	11·5	30·7
	Control	246	28·8		4·9	9·3	14·6
Severe	Experimental	144	57·7	23·9±6·9	2·1	5·6	50·0
	Control	74	33·8		2·7	4·1	27·0

TABLE 249

Arterial Wounds—Infective Complications

Artery		No. of Cases	% Infective Complications	Specific Complications (%)				% Ischaemic Gangrene
				Osteomyelitis and Sequestrum	Deep Wound Infection	Gas Gangrene	Pneumonic Conditions	
Axillary and Subclavian	Experimental	6	33·3	—	16·7	16·6	—	16·7
	Control	6	66·6	—	66·6	—	—	—
Brachial	Experimental	32	15·6	—	12·5	3·1	—	3·1
	Control	2	50·0	—	50·0	—	—	—
Femoral	Experimental	31	35·5	—	25·8	6·5	3·2	25·8
	Control	6	50·0	—	50·0	—	—	—
Popliteal	Experimental	14	35·7	7·1	28·6	—	—	35·7
	Control	1	—	—	—	—	—	—
All	Experimental	83	27·7	1·2	20·5	4·8	1·2	18·1
	Control	15	53·3	—	53·3	—	—	—

TABLE 250

Chest Wounds—Infective Complications

	Total Cases	Cases WITH Haemothorax, Pneumothorax or Haemopneumothorax, etc.		Cases WITHOUT Haemothorax Pneumothorax, or Haemopneumothorax, etc.	
		% Complications	Difference	% Complications	Difference
Experimental	283	19·9	0·6±4·4	16·2	10·8±9·5
Control	164	20·5		27·0	

§5 TREATMENT OF GONORRHOEA WITH PENICILLIN AND WITH SULFA DRUGS

WITH one exception the following tables refer to cases (Male O.Rs.) of Gonorrhoea treated in United Kingdom hospitals between January, 1943 and September, 1945, based on a ten per cent. sample of A.Fs. I1220. Information was available thereon w.r.t. diagnosis, age, duration of stay in hospital, courses of treatment by date, presence or absence of relapse, interval from completion of stay in hospital to day of subsequent admission, where relevant, and previous history w.r.t. the disease. In this context, gonorrhoea includes *both* cases confirmed by microscopic examination and unconfirmed clinical cases, unless otherwise stated. Three criteria of therapeutic efficacy are practicable:

(*a*) response to a single course of treatment;

(*b*) relapse rate;

(*c*) duration of stay in medical unit.

A common difficulty of enquiries of this sort arises from the fact that the physician's proper concern is to cure the patient by any means at his disposal rather than to conform to the requirements of a controlled experiment. Hence many patients receive more than one method of treatment, concurrently or successively. For this reason it has been convenient to classify the records w.r.t. treatment in two major groups:

I those who received initially a single course of: (*i*) *penicillin*, (*ii*) *sulphathiazole*, (*iii*) *sulphapyridine*;

II those who received treatment with one or other of the above and simultaneous irrigation with either $KMnO_4$ or HgOCN.

The operative word in I is *initially*, because any case which fails to respond to a single course of therapy normally receives additional treatment. This circumstance permits us to refine our criterion of *success*. Since no case is ordinarily discharged from hospital without a clean bill, the use of a single method or simultaneous combination of two methods followed by no other is a sufficient indication that such a course is successful. Conversely, recourse to additional courses after a lapse of time sufficient to assess the value of the primary treatment is an admissible criterion of failure. It follows that our data provide no clear guidance with respect to the efficacy of a combination of *successive*, as opposed to *simultaneous* therapies. Individuals who receive a subsequent course of treatment may be highly selected, both because they are patients who fail to respond to a single method, and because the Venereologist will exercise his clinical judgment to prescribe the choice of further treatment. Accordingly, comparison of data concerned with the efficacy of more than one method of treatment refers only to *simultaneous* application of different procedures.

As a criterion of efficacy on its own merits, the relapse rate (here defined as re-admission within 60 days) calls for no comment; but it is possible to apply a more exacting yardstick of cure than the one specified in preceding remarks by combining information both with respect to failure to respond to a single (unitary or composite) course of treatment, and to recurrence after discharge from hospital. What we here designate a *permanent* cure therefore signifies a case: (*a*) completed without recourse to subsequent treatment; (*b*) not admitted again to hospital within the arbitrary period of 2 months, delimited with due regard to the danger of confusing a genuine relapse with a reinfection. The limitations inherent in use of duration of stay as a yardstick in this context will come up for discussion later. To avoid periphrasis, it will be convenient to designate as SIMPLE treatment, a single course of penicillin or sulphonamide *without* simultaneous adjuvant therapy (here *irrigation*). In contradistinction to simple treatment so defined, COMPOSITE treatment refers to II above.

Comparative Efficacy of Simple Treatments

The table below shows response to simple courses of penicillin, sulphathiazole and sulphapyridine. A *success* signifies discharge from hospital without recourse to treatment other than the one specified. With the usual convention for delimiting the range of likelihood at the 5% level, we may say that penicillin alone guarantees between 80% and 90% success. For the sulfa drugs the corresponding figure is between 55% and 65%. No statistical significance pertains to the difference between the two sulfa drugs on the basis of this sample.

	No. of cases	*% Successes*	*Difference*	
Penicillin	251	86·5±2·2	23·6±2·9 (Penicillin–Sulphathiazole)	27·5±4·2 (Penicillin–Sulphapyridine)
Sulphathiazole	569	62·9±2·0	3·9±4·1 (Sulphathiazole–Sulphapyridine)	
Sulphapyridine	195	59·0±3·4		

Of itself, the relapse rate shown below discloses no significant difference between the three treatments:

	No. of successful cases	*% Relapses*	*Difference*	
Penicillin	217	6·5±1·7	3·8±2·3 (Penicillin–Sulphathiazole)	1·5±2·7 (Penicillin–Sulphapyridine)
Sulphathiazole	358	10·3±1·6	3·3±2·1 (Sulphathiazole–Sulphapyridine)	
Sulphapyridine	115	7·0±2·1		

Since there is no statistically detectable difference w.r.t. recurrence of the disease in cases deemed to be *successfully* treated by the criterion stated above, we should expect that the result of applying the alternative yardstick of *permanent cure*, as defined in this context, would expose an essentially similar picture, as the following figures show:

	No. of cases	*% Permanent Cures*	*Difference*	
Penicillin	251	80·9±2·5	24·5±3·1 (Penicillin–Sulphathiazole)	26·0±4·3 (Penicillin–Sulphapyridine)
Sulphathiazole	569	56·4±2·1	1·5±4·1 (Sulphathiazole–Sulphapyridine)	
Sulphapyridine	195	54·9±3·6		

Comparative Efficacy of Composite Treatments.

With due regard to numbers available in classes so defined, analysis of composite treatments is profitable only w.r.t. patients who received simultaneous irrigation by either $KMnO_4$ or HgOCN together with one or other of the three primary courses already discussed. The next table shows proportions of successful response to such composite treatment.

	No. of cases	*% Successes*	*Difference*	
Penicillin	17	88·2±8·0	2·3±8·3 (Penicillin–Sulphathiazole)	4·5±8·5 (Penicillin–Sulphapyridine)
Sulphathiazole	299	85·9±2·0	6·8±3·7 (Sulphathiazole–Sulphapyridine)	
Sulphapyridine	69	92·7±3·1		

As before, relapse rates for this group of themselves reveal no differential efficacy; and application of the alternative criterion of permanent cure yields results essentially like the above:

	No. of cases	*% Permanent Cures*	*Difference*	
Penicillin	17	82·4±9·5	1·5±9·8 (Penicillin–Sulphathiazole)	6·0±10·3 (Penicillin–Sulphapyridine)
Sulphathiazole	299	80·9±2·3	7·5±4·4 (Sulphathiazole–Sulphapyridine)	
Sulphapyridine	69	88·4±3·8		

If our only criterion of efficacy is the outcome of a single course of treatment, it thus appears that sulfa drugs administered with simultaneous irrigation are as efficacious as penicillin alone or with corresponding adjuvant treatment. We may summarize the foregoing evidence thus:

	No. of cases	% Permanent cures	Difference		
Penicillin alone	251	80·9±2·5	1·5±9·7	0·0±3·5	7·5±4·8
Penicillin + Irrigation	17	82·4±9·5			
Sulphathiazole alone	569	56·4±2·1	24·5±3·0		
Sulphathiazole + Irrigation	299	80·9±2·3			
Sulphapyridine alone	195	54·9±3·6	33·5±5·3		
Sulphapyridine + Irrigation	69	88·4±3·8			

The preceding tables draw no distinction between the result of irrigation with potassium permanganate ($KMnO_4$) on the one hand and of irrigation with mercury oxycyanide (HgOCN) on the other. The following rates reveal a striking difference.

	No. of cases	% Successes	Difference		% Permanent Cures	Difference	
Sulphathiazole alone	569	62·9±2·0	27·4±2·9	12·9±4·7	56·4±2·1	27·9±3·3	14·1±5·1
Sulphathiazole+$KMnO_4$	204	90·3±2·1	14·5±4·9		84·3±2·5	13·8±5·2	
Sulphathiazole+HgOCN	95	75·8±4·4			70·5±4·7		

Dosage

No estimate of response to chemotherapy is complete without examination of the doses involved, particularly when the yardstick of efficacy is response to a single course of treatment. Table 251 summarizes data in the records used for this enquiry. It shows that the proportion of permanent cures with sulphonamide treatment is about 60%, to a large extent independent of the dosage.

Resistance to Sulfa Drugs

One question which the examination of these records prompts is: does the use of sulfa drugs involve a selective process in virtue of which the proportion of sulfa-fast patients increases in the course of time? Over the period covered by these records, the data disclose no evidence of a consistent trend indicative of such selection. For no half-year in the period covered by Table 252, below, is the level of cure for simple treatment by sulfa drugs significantly greater or less than for the sample as a whole. On the other hand the population at risk during this period was by no means homogeneous, since there was large scale transfer of troops from the United Kingdom to the Western front. Moreover, the proportion of cases treated in hospital as opposed to units greatly increased towards the end of the period. This may conceivably have brought within the orbit of the hospital population a higher proportion of less resistant cases. Thus the lack of definite indication from the data of Table 252 certainly does not justify a negative answer to the question stated above.

Duration of Treatment

With due regard to variation arising from administrative instructions, *duration of stay* in hospital may be a useful yardstick of therapeutic efficacy if a condition involves protracted hospitalization; but the inevitable delays involved in transfers of patients to and from medical units exclude any reliance upon it, when the total time spent in hospital is about a week or less. Hence we should not expect any conspicuous difference between treatments to show up in the hospital sample tabulated below.

	No. of cases	Mean stay (days)
Penicillin	215	6·8
Sulphathiazole	358	8·8
Sulphapyridine	113	9·8

Data supplied by a sample of 864 A.Fs. W3118 record interval between admission to forward units (B.L.A.) and cessation of urethral discharge. These disclose a striking difference, and hence show how unavoidable delays inherent in hospital administration attenuate such figures as those cited above. The relevant figures for forward units, exhibited below, show that simple treatment with pencillin excels simple treatment with sulfa drugs with respect to both the rapidity of the cure and the proportion of successes.

	No. of cases	Mean Stay (days)
Penicillin (alone)	598	1·9
Sulfa Drugs (alone)	266	5·8

Diagnostic Criteria

All previous data refer to records citing *gonorrhoea* as the primary diagnosis, including some cases w.r.t. which smears failed to confirm the clinical specification and others w.r.t. which documents cite no result of the smear test. In view of uncertainty pertaining to the proportion of *non-specific* cases among patients with negative smears, it is desirable to check conclusions previously advanced by rejecting from our pool of data all cases w.r.t. which the results of the smear test proved to be negative or are not explicit in the records. The ensuing table which sets forth the results of doing so, is consonant with results already recorded.

G-C Smear Positive Cases (*a*) Simple treatment

	No. of cases	% Successes	% Successes which relapsed	% Permanent cures
Penicillin	226	88·5±2·1	6·5±1·7	82·7±2·5
Sulphathiazole	456	61·4±2·3	11·1±1·9	54·6±2·3
Sulphapyridine	146	58·2±4·1	4·7±2·3	55·5±4·1

G-C Smear Positive Cases (*b*) with Irrigation

	No. of cases	% Successes	% Successes which relapsed	% Permanent cures
Penicillin	13	92·3±7·4	8·3±8·0	84·6±10·0
Sulphathiazole	217	86·6±2·3	6·4±1·8	81·1± 2·7
Sulphapyridine	60	91·7±3·6	7·3±3·5	85·0± 4·6

Summary

The following conclusions emerge from what has gone before:

(*a*) Simple treatment with penicillin is more efficacious than simple treatment with sulphonamides. In this sample, penicillin guaranteed 85-90% success, of which less than 10% relapsed. Simple treatment with sulfa drugs gave 55-65% successes, of which about 10% relapsed in the same time, *i.e.*, within 60 days.

(*b*) If our *sole* criterion of efficacy is recovery without recourse to further therapy, composite treatment with sulphonamides and simultaneous irrigation ensures a level of success as high as penicillin alone, but simultaneous irrigation does not appear to increase the efficiency of penicillin therapy.

(*c*) When used simultaneously with sulphathiazole, potassium permanganate is more effective than mercury oxycyanide.

(*d*) Analysis of cases with diagnosis confirmed by microscopy yields results similar to those cited above.

(*e*) Correct assessment of the conclusions stated in (*a*) and (*b*) presupposes that we also give weight to the greater efficiency of penicillin in terms of *duration of treatment*.

TABLE 251 **Proportion of Cures by "Dosage" in a Single Course of "Simple" Treatment**

	Penicillin		Sulphathiazole			Sulphapyridine		
	<100,000 units	100,000 to 200,000 units	<15 grams	15-19 grams	>20 grams	<15 grams	15-19 grams	>20 grams
No. of Cases	(1)	250	23	195	331	9	49	130
% Cures....	(100)	80·2 ± 2·5	60·9 ± 9·0	58·5 ± 3·4	58·6 ± 2·7	55·6 ± 17·6	51·0 ± 7·1	57·7 ± 4·3
			2·4 ± 9·6		0·1 ± 4·4	4·6 ± 19·0		6·7 ± 8·4
Difference				2·3 ± 9·4			2·1 ± 18·1	

TABLE 252 **Proportion of Cures after "Simple" Treatment with Sulfa Drugs at Different Time-periods**

	SULPHATHIAZOLE		SULPHAPYRIDINE		ALL SULFA DRUGS	
	% Cure	Difference*	% Cure	Difference*	% Cure	Difference*
1943 January-June	64·9 ± 4·1	8·3 ± 4·5	58·9 ± 4·0	4·0 ± 5·4	61·8 ± 2·9	5·6 ± 3·4
July-December	57·0 ± 3·6	0·4 ± 4·2	38·0 ± 9·2	16·9 ± 9·8	54·6 ± 3·4	1·6 ± 3·8
1944 January-June	50·0 ± 4·9	6·6 ± 5·3	39·0 ± 14·1	15·9 ± 14·5	48·8 ± 4·6	7·4 ± 4·8
July-December	48·4 ± 5·1	8·2 ± 5·6	(100·0)		48·9 ± 5·2	7·3 ± 5·4
1945 January-June	58·5 ± 7·8	1·9 ± 8·1	(100·0)		63·9 ± 7·5	7·7 ± 7·7
July-December	77·8 ± 14·7	21·2 ± 14·8	—		77·8 ± 14·7	21·6 ± 14·8
Whole Sample	56·6 ± 2·1		54·9 ± 3·6		56·2 ± 1·8	
TOTAL CASES	567		195		762	

*Between each individual period and the whole sample.

§6 TREATMENT OF IMPETIGO WITH PENICILLIN AND WITH SULFA DRUGS

IN the United Kingdom, *Impetigo* accounts for about 2 per cent. of man-days lost to Army service. It is therefore a major source of wastage. The extraction of new information bearing on the assessment of procedures to combat it calls for no further justification. Such was the aim which prompted examination of a sample of A.Fs. I1220 received w.r.t. cases hospitalized in the United Kingdom during 1943-44. The size of the sample was 1031. With respect to treatment the documents admit of a threefold classification as follows:

(i) over a half (52·2%), here denoted Group O, received only lotions, ointments, compresses and drugs other than those of the sulfa group;
(ii) a group (S) of 425 cases (41·2%) received sulfa drugs, *e.g.*, microcrystalline thiazole and sulphanilamide powder;
(iii) a small residual group (P) of 68 (6·6%) received penicillin.

The clinical notes indicated that some of the cases had previously suffered from the disease. Over 80% were apparently new. As shown below, the proportions of new cases in the three groups were not significantly different.

	O.	S.	P.
New Cases	80·7±1·7	83·7±1·8	79·4 ±4·9
Relapses	19·3	16·3	20·6
Total	100·0	100·0	100·0
	(538)	(425)	(68)

In the absence of more specific indications provided by clinical notes on the case record, Army medical documents furnish the following yardsticks for the assessment of therapeutic procedures: (*a*) *mortality rates*; (*b*) *relapse rates*; (*c*) *rate of subsequent discharge from the Service on medical grounds*; (*d*) *supervening diseases and/or complications*; (*e*) *duration of hospitalization before return to duty*; (*f*) *subsequent medical recategorization.* It is rarely practicable to make use of all these criteria. If a disease is not a serious source of *total* wastage neither (*a*) nor (*c*) is practicable. Impetigo is not fatal. It is rarely a sufficient reason for discharge from the Army; and is not commonly associated with supervening disease or characteristic complications. Administrative recommendations to ensure reliable information respecting medical recategorization had not taken effect when this enquiry began. We are thus left with (*b*) and (*e*). Though figures cited above suggest that the relapse rate is not negligible, relapses which occur in the Army are trivial. Our only practicable yardstick is, therefore, (*e*). Mean duration of stay is admittedly a criterion liable to bias resulting from administrative considerations which govern hospital policy or disposal; but if the classes of a large sample are contemporaneous, the association of shorter mean duration with a given treatment constitutes a strong *prima facie* case for its greater intrinsic efficacy.

The following figures exhibit the mean duration (*days*) of hospitalization for each of the 3 groups taken as a whole (*i.e.* including both new cases and cases with a previous history of the disease):

	Mean Duration of Stay	Difference
Group O (neither sulfa drugs nor penicillin)	19·5±0·68	
		3·8±0·84
Group S (sulfa drugs)	15·7±0·50	
		3·6±0·92
Group P (penicillin)	12·1±0·77	

Each of the differences recorded above is significant, *i.e.*: (*a*) duration of stay w.r.t. penicillin treatment is significantly shorter than w.r.t. treatment with sulfa drugs; (*b*) duration of stay w.r.t. treatment with sulfa drugs is significantly shorter than w.r.t. treatment with neither sulfa drugs nor with penicillin. Though the differences w.r.t. composition of the sample, in so far as the proportion of putatively new cases might bias the result, are not statistically significant, the issue calls for a check. A similar analysis of *new cases only* yields the following results:

	Mean Duration of Stay	Difference	No. of Cases
Group O	18·3±0·7		434
		3·1±0·86	
Group S	15·2±0·5		356
		3·4±0·86	
Group P	11·8±0·7		54

A similar analysis of the chronic class yields the following:

	Mean Duration of Stay	Difference	No. of Cases
Group O	24·5±2·0		104
		6·4±2·4	
Group S	18·1±1·3		69
		4·7±2·8	
Group P	13·4±2·5		14

All the differences in the last two sets of figures tally, and all are statistically significant except the difference between the S and P relapses. The dubious significance of the latter difference is sufficiently explicable on account of the very small number of cases in the P group. However, the difference w.r.t. mean duration of stay after penicillin treatment of the chronic cases (denoted as *relapses* above) and treatment of such individuals with neither penicillin nor sulfa drugs is highly significant, being 11·1±3·2.

As we might well expect, the preceding breakdown suggests that chronic cases are more recalcitrant to treatment. It is therefore fitting to exhibit the two sets of figures w.r.t. duration of stay in a different way:

	New Cases	Chronic Cases	Difference
Group O	18·3±0·7	24·5±2·0	6·2±2·1
Group S	15·2±0·5	18·1±1·3	2·9±1·4
Group P	11·8±0·7	13·4±2·5	1·6±2·6

Preceding remarks have drawn attention to one disadvantage of using duration of stay as the only practicable yardstick of therapeutic efficacy, insofar as it is liable to bias arising out of differences of administrative procedure. It is therefore important to take cognisance of the fact that some patients received treatment in E.M.S., others in military hospitals. This consideration is particularly pertinent, because the mean duration of stay for skin diseases is somewhat greater in the former than in the latter. Hence differential distribution with respect to the two types of hospitals in groups subjected to different methods of treatment might well account for the different results recorded above, if the proportionate contribution of E.M.S. hospitals was greater for treatment groups with longer duration of stay. Analysis of the sample from this point of view reveals that this is so. Fortunately, the difficulty is easy to short-circuit because the majority of cases dealt with received treatment in military hospitals, and these groups alone suffice to provide a homogeneous sample large enough to act as a check on conclusions seemingly justified by figures exhibited in preceding tables. The figures below refer to fresh infections treated *only* in military hospitals:

Fresh Infections—Military Hospitals

	Mean Duration of Stay	Difference	No. of Cases
Group O	17·7±0·7		312
		3·2±0·9	
Group S	14·5±0·6		277
		3·0±0·9	
Group P	11·5±0·7		48

A similar analysis of chronic cases treated in military hospitals yields the following results:

Chronic Infections—Military Hospitals

	Mean Duration of Stay	*Difference*	*No. of Cases*
Group O	24·5±2·3		87
		5·9±2·6	
Group S	18·6±1·4		59
		5·6±2·6	
Group P	13·0±2·2		14

The foregoing analysis of cases treated only in military hospitals confirms all the conclusions which a corresponding treatment of the whole sample appears to justify; and thus removes any misgivings prompted by the inclusion of cases treated in hospitals of the two types. As before we find that the chronic cases are more recalcitrant, as the following figures w.r.t. duration of stay show:

	New Cases	*Chronic Cases*	*Difference*
Group O	17·7±0·7	24·5±2·3	6·8±2·4
Group S	14·5±0·6	18·6±1·4	4·1±1·5
Group P	11·5±0·7	13·0±2·2	1·5±2·3

From an administrative standpoint, we may exhibit the figures to bring into clearer perspective the proportion of individuals returning to duty within a given period, as below:

	ALL HOSPITALS			MILITARY HOSPITALS ONLY		
	10 days	20 days	30 days	10 days	20 days	30 days
Group O	30·0	73·4	84·5	31·8	68·2	84·5
Group S	34·3	82·8	87·4	35·7	83·9	91·7
Group P	47·1	94·1	97·0	49·2	93·7	96·8

Summary

While it is possible that individual methods of treatment included in the mixed group O are as efficacious as either sulfa drugs or penicillin, the data exhibited in this section demonstrate the superiority of sulfa drugs and of penicillin to other therapies considered collectively, and the superiority of penicillin to sulfa drugs w.r.t. impetigo treatment. The mean duration of hospitalization of impetigo patients treated with sulfa drugs is about 20% less than that of patients treated with neither sulfa drugs nor with pencillin. The mean duration of hospitalization of patients treated with penicillin is between 35% and 40% less than that of patients treated with neither penicillin nor sulfa drugs. In terms of man-day wastage this means that: (*a*) less than 75% of impetigo patients treated with neither penicillin nor sulfa drugs are out of hospital within 3 weeks; (*b*) between 80% and 85% treated with sulfa drugs and between 90% and 95% of patients treated with penicillin leave hospital within the same period.

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Chart I

RELATIVE DISCHARGE RATES (O.Rs.)—1943-1944

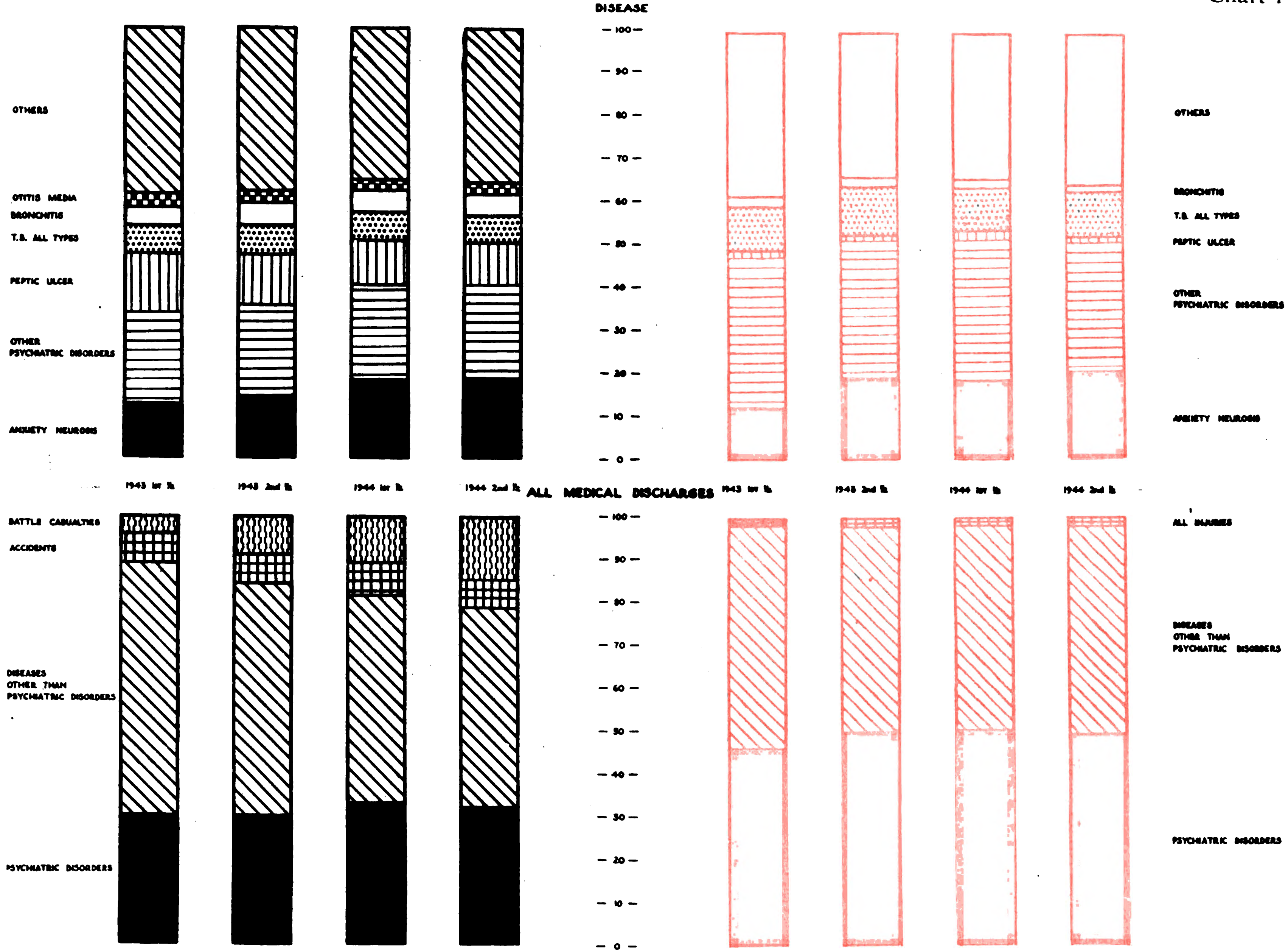

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Chart 2

RELATIVE DISCHARGE RATES IN CATEGORY C AND CATEGORY E (O.Rs.)

JANUARY-MARCH, 1945

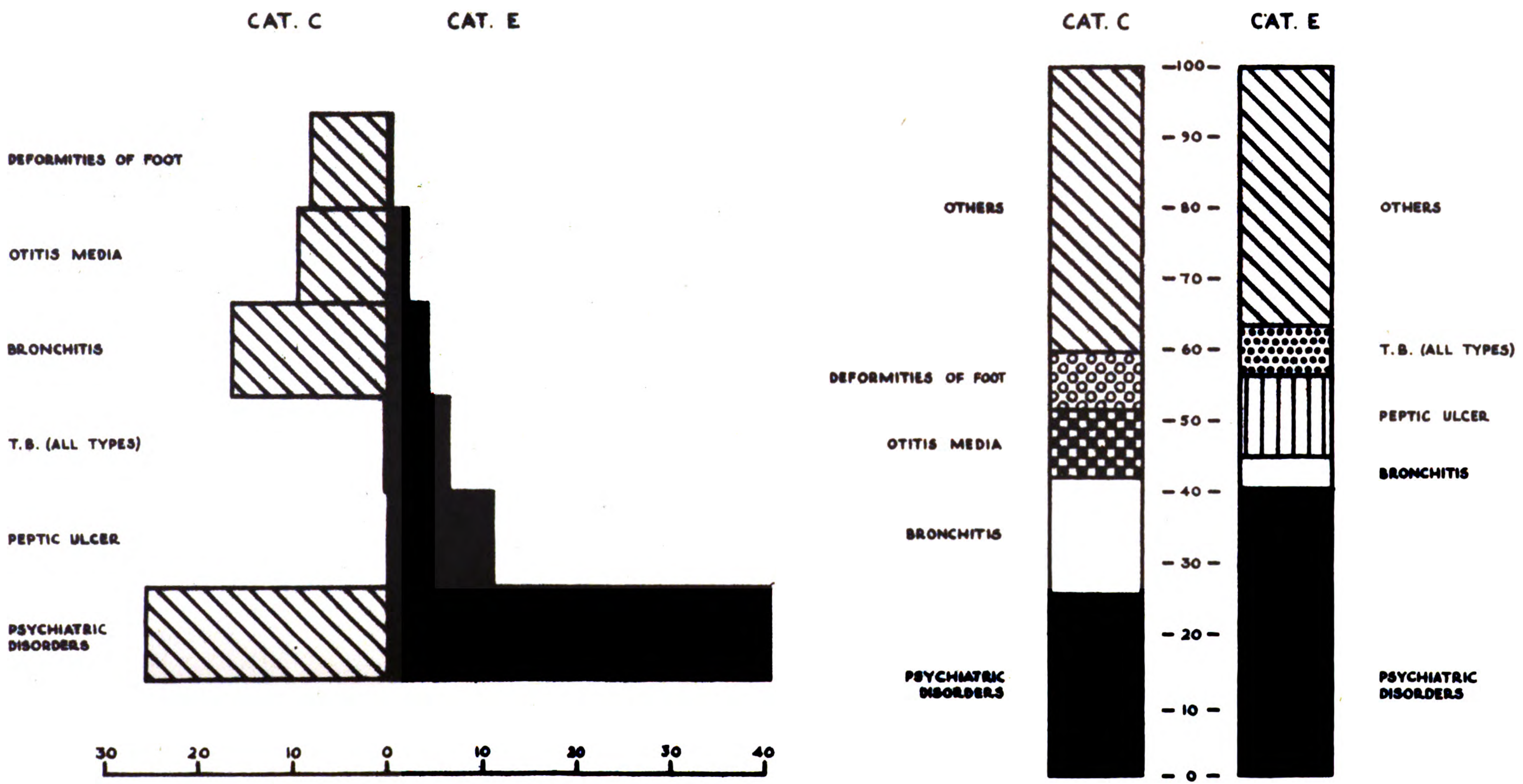


Chart 3

SEX DIFFERENTIALS W.R.T. DISCHARGES—1944
RATIO OF A.T.S. TO MILITARY RATES

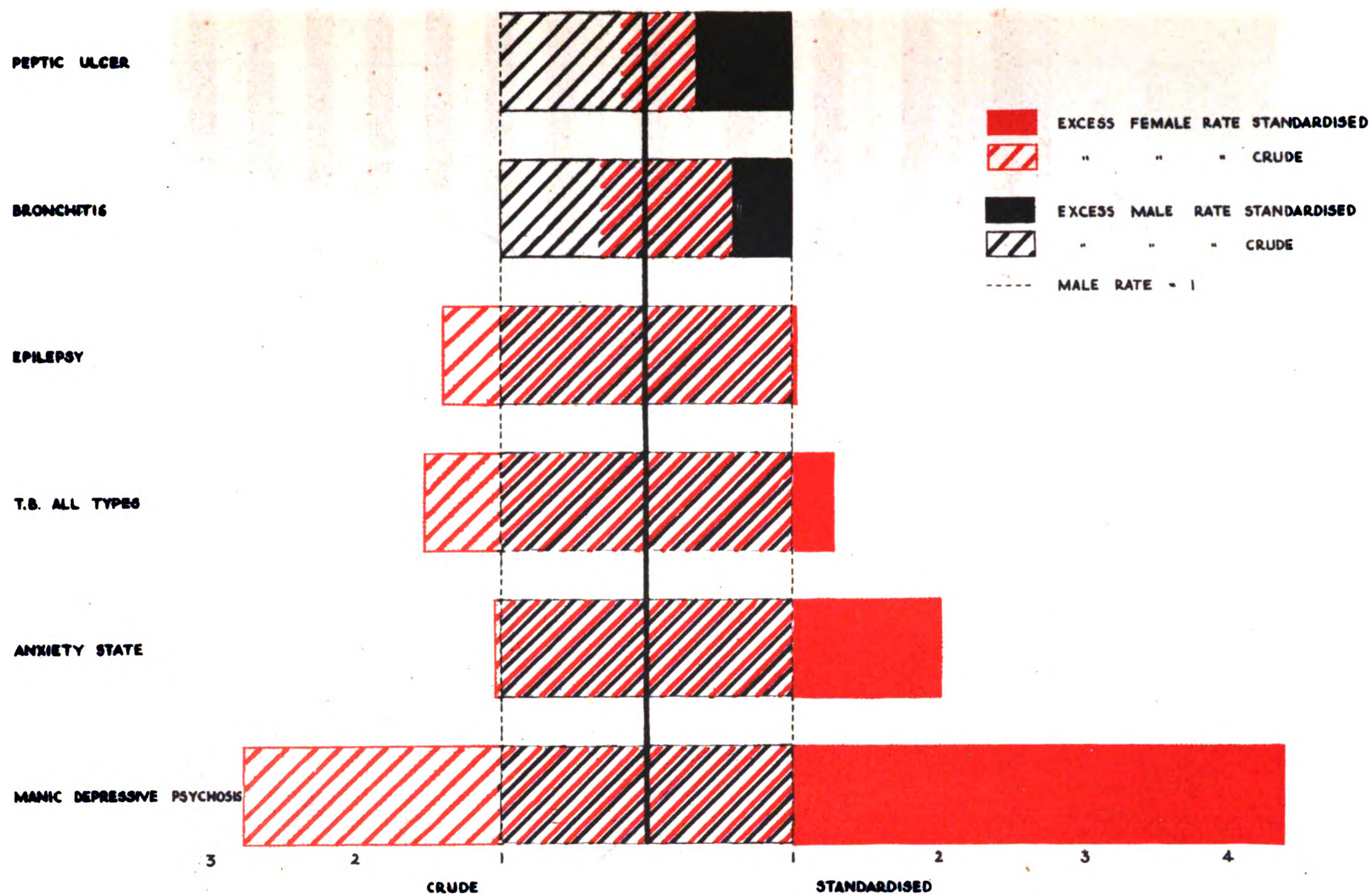
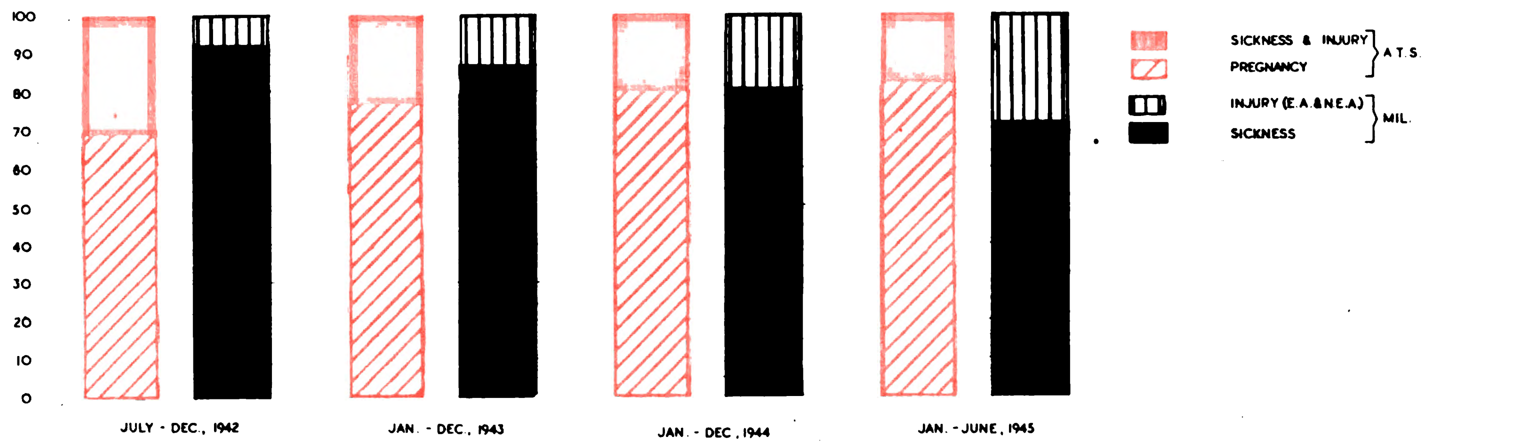


Chart 4

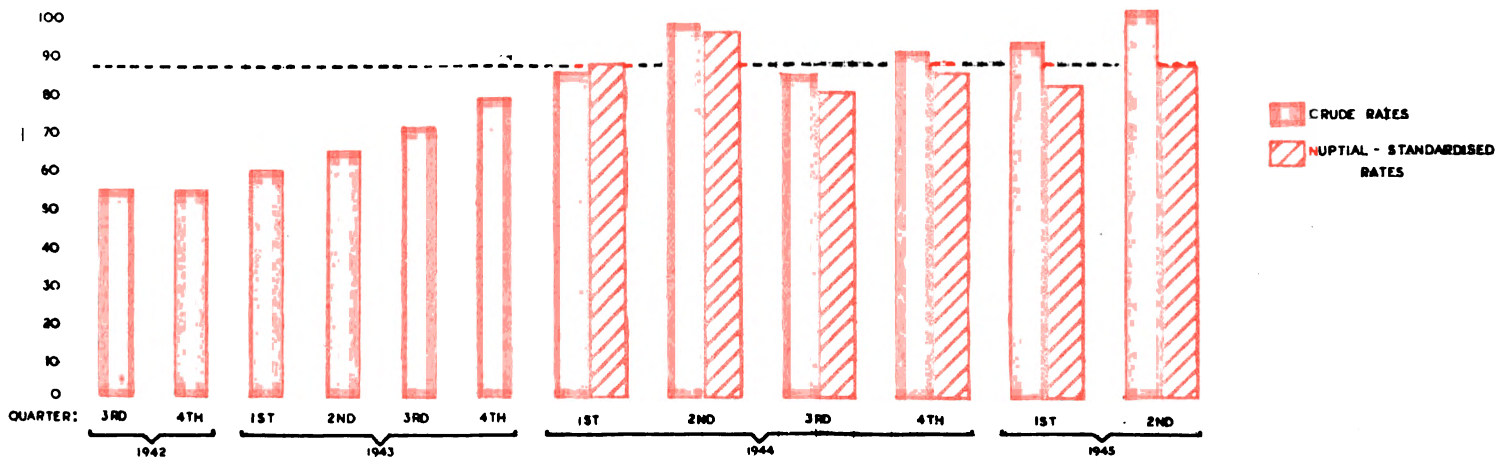
RELATIVE DISCHARGE RATES

JULY, 1942 - JUNE, 1945



CRUDE & NUPTIAL - STANDARDISED PREGNANCY RATES

E. A. R. PER 1000 STRENGTH



RELATIVE MORTALITY W.R.T. SICKNESS U.K.
JANUARY, 1943 - JUNE, 1944

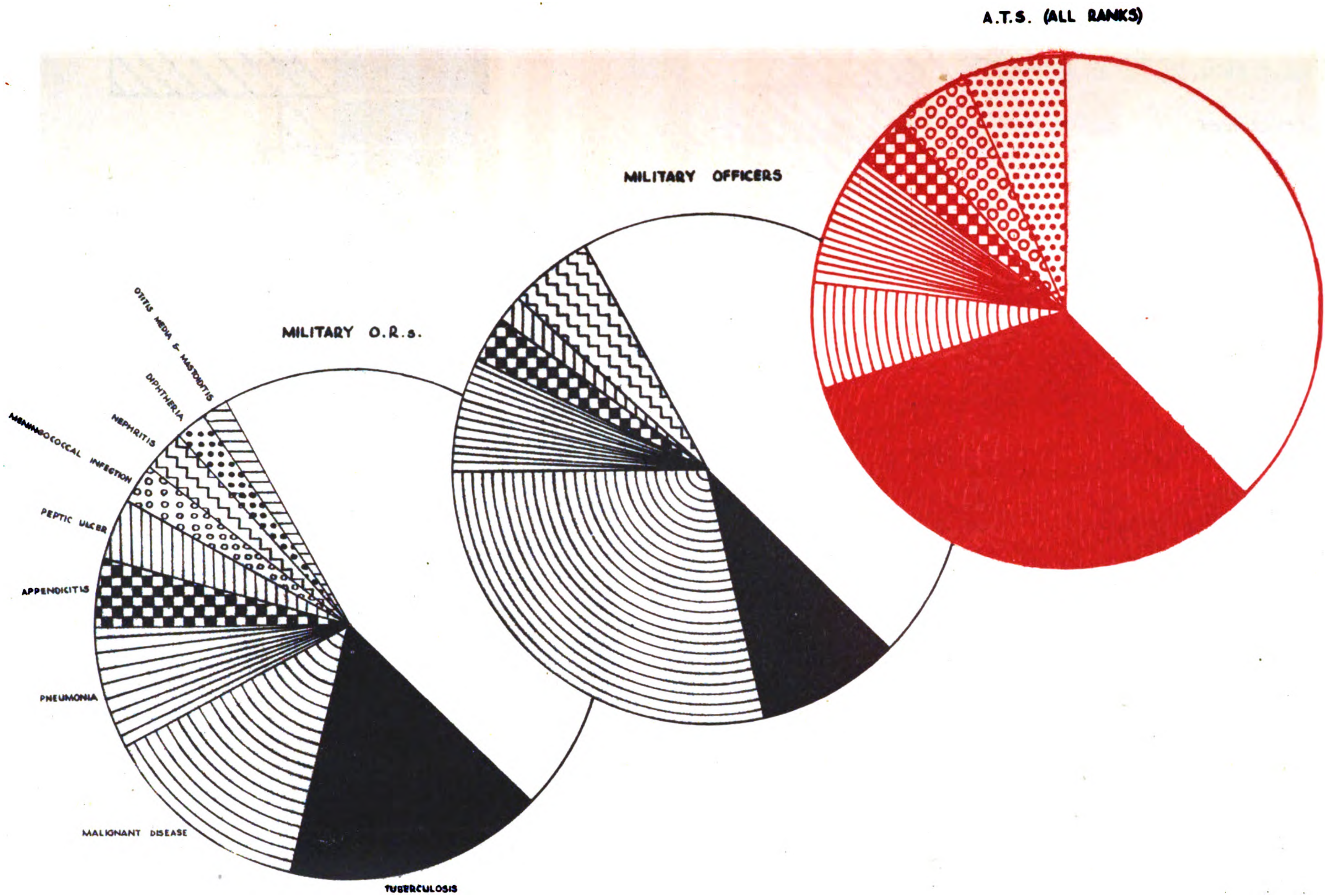
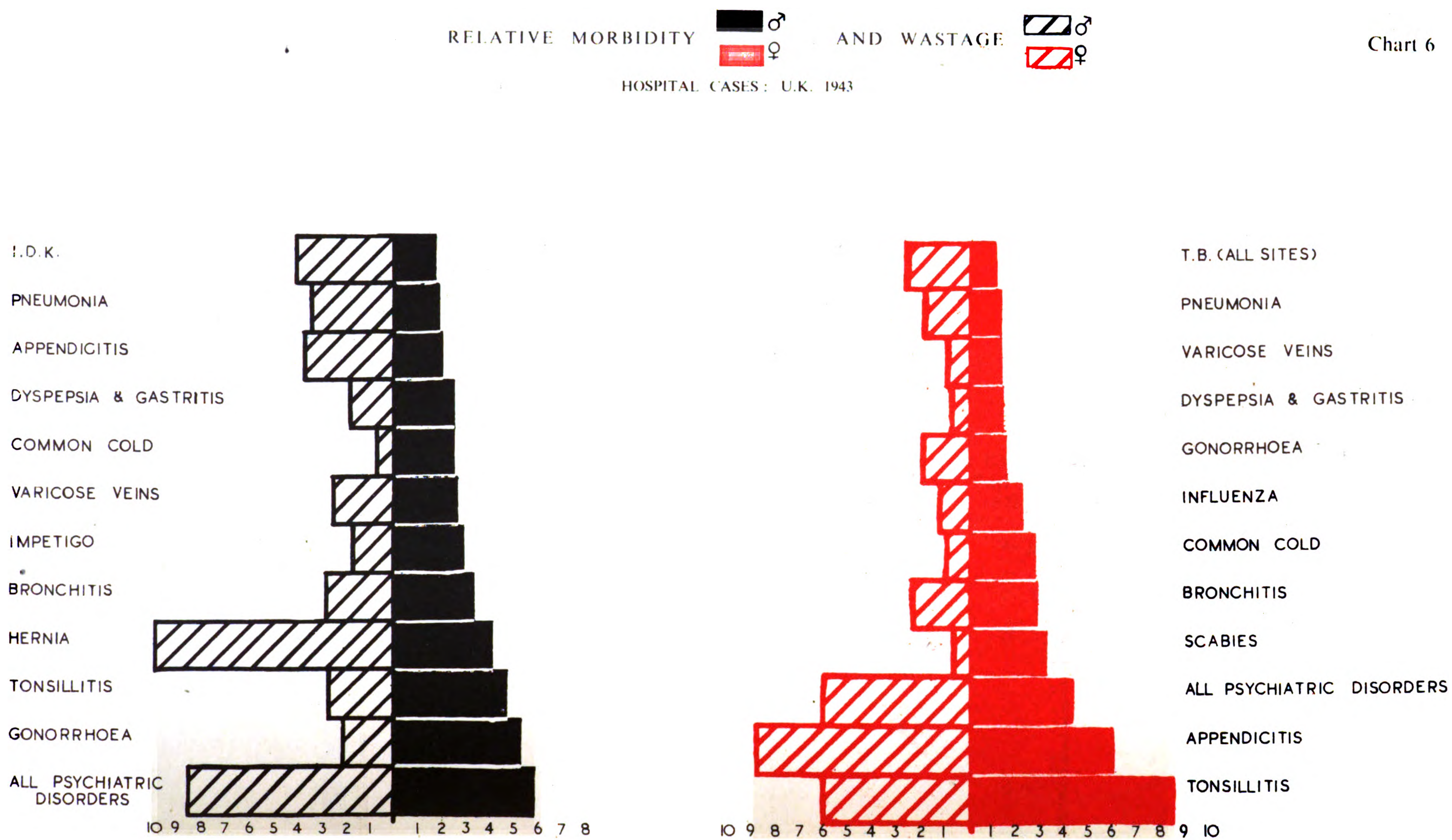


Chart 6

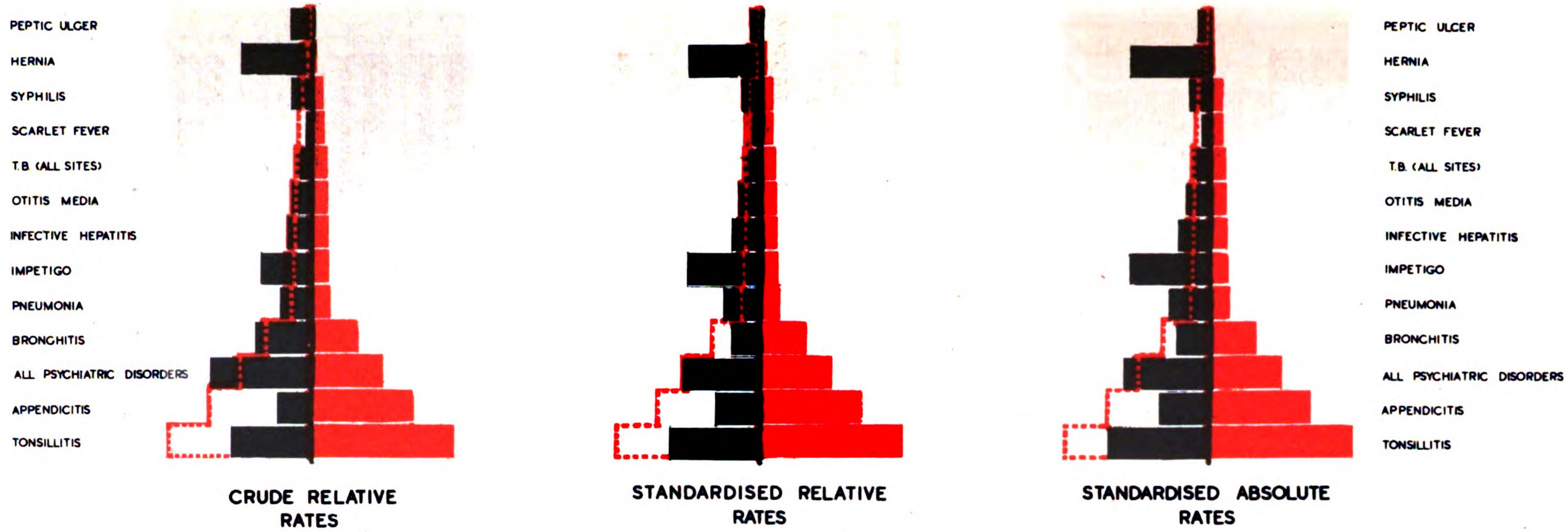


RELATIVE MORBIDITY ♂ ♀ AND WASTAGE ♂ ♀
HOSPITAL CASES: U.K. 1943
I.D.K.
PNEUMONIA
APPENDICITIS
DYSPEPSIA & GASTRITIS
COMMON COLD
VARICOSE VEINS
IMPETIGO
BRONCHITIS
HERNIA
TONSILLITIS
GONORRHOEA
ALL PSYCHIATRIC DISORDERS
10 9 8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
T.B. (ALL SITES)
PNEUMONIA
VARICOSE VEINS
DYSPEPSIA & GASTRITIS
GONORRHOEA
INFLUENZA
COMMON COLD
BRONCHITIS
SCABIES
ALL PSYCHIATRIC DISORDERS
APPENDICITIS
TONSILLITIS
10 9 8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8 9 10

Chart 7

SEX DIFFERENCES W.R.T. MORBIDITY

HOSPITAL CASES: U.K. 1943



SEX DIFFERENTIALS

A. T. S. : MILITARY

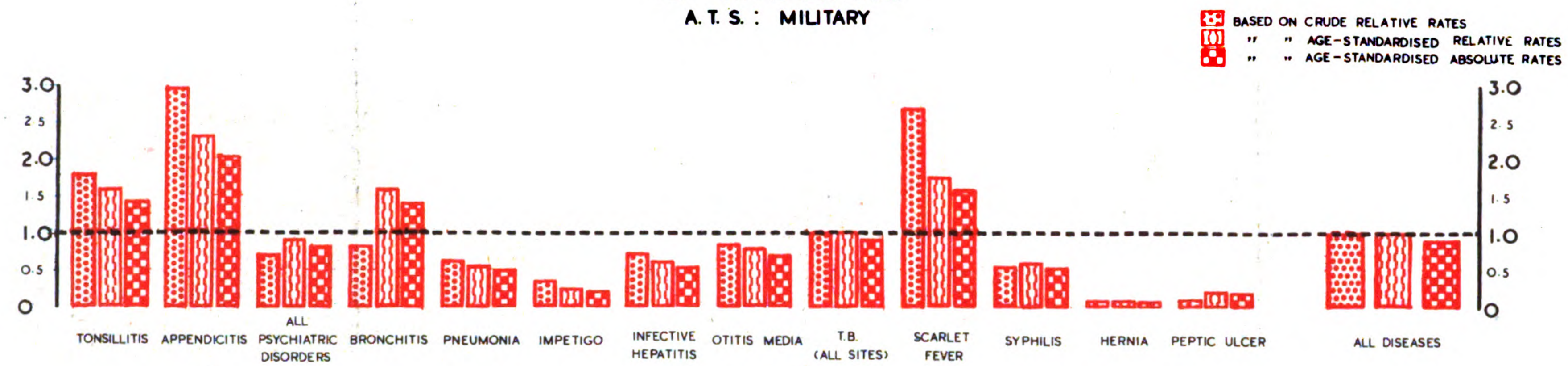
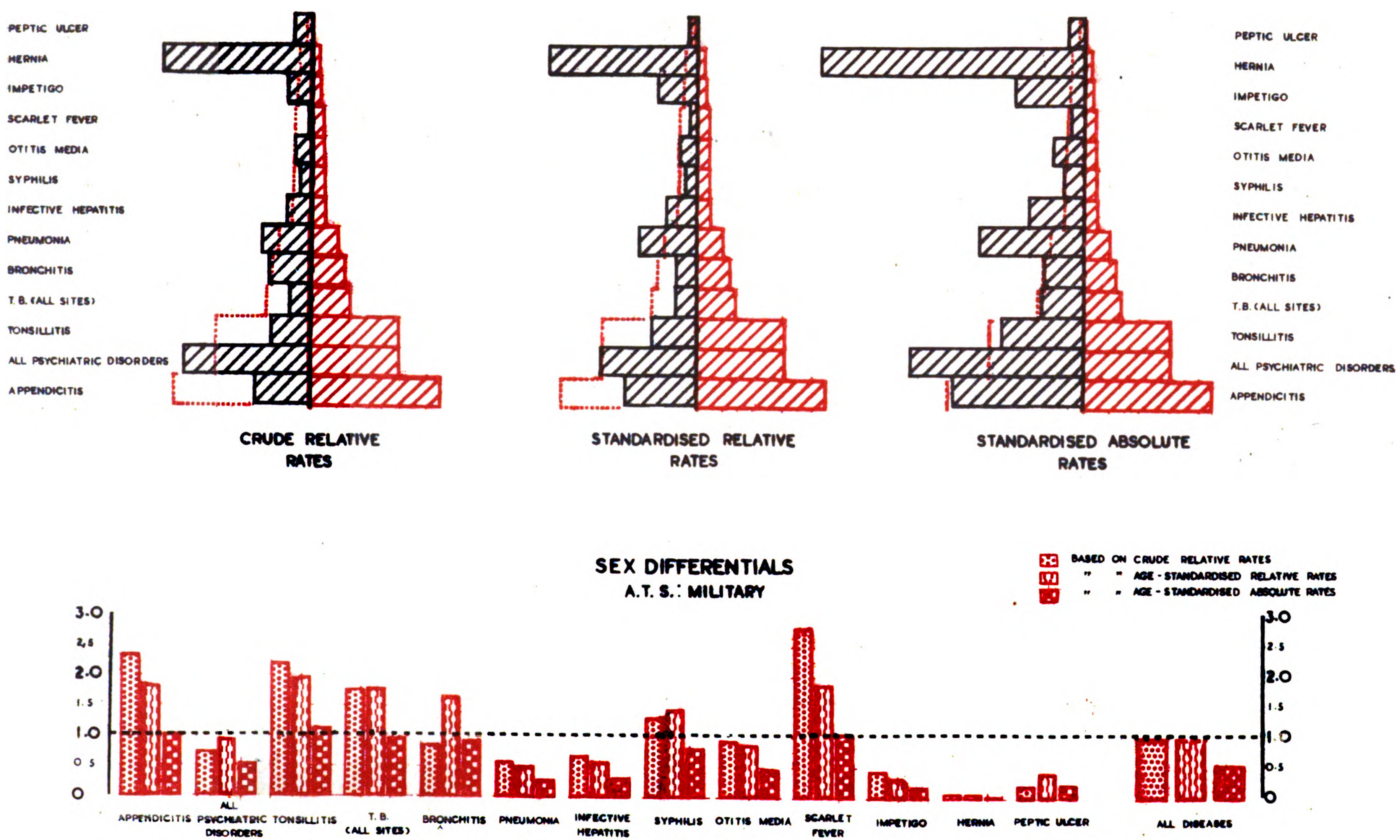


Chart 8

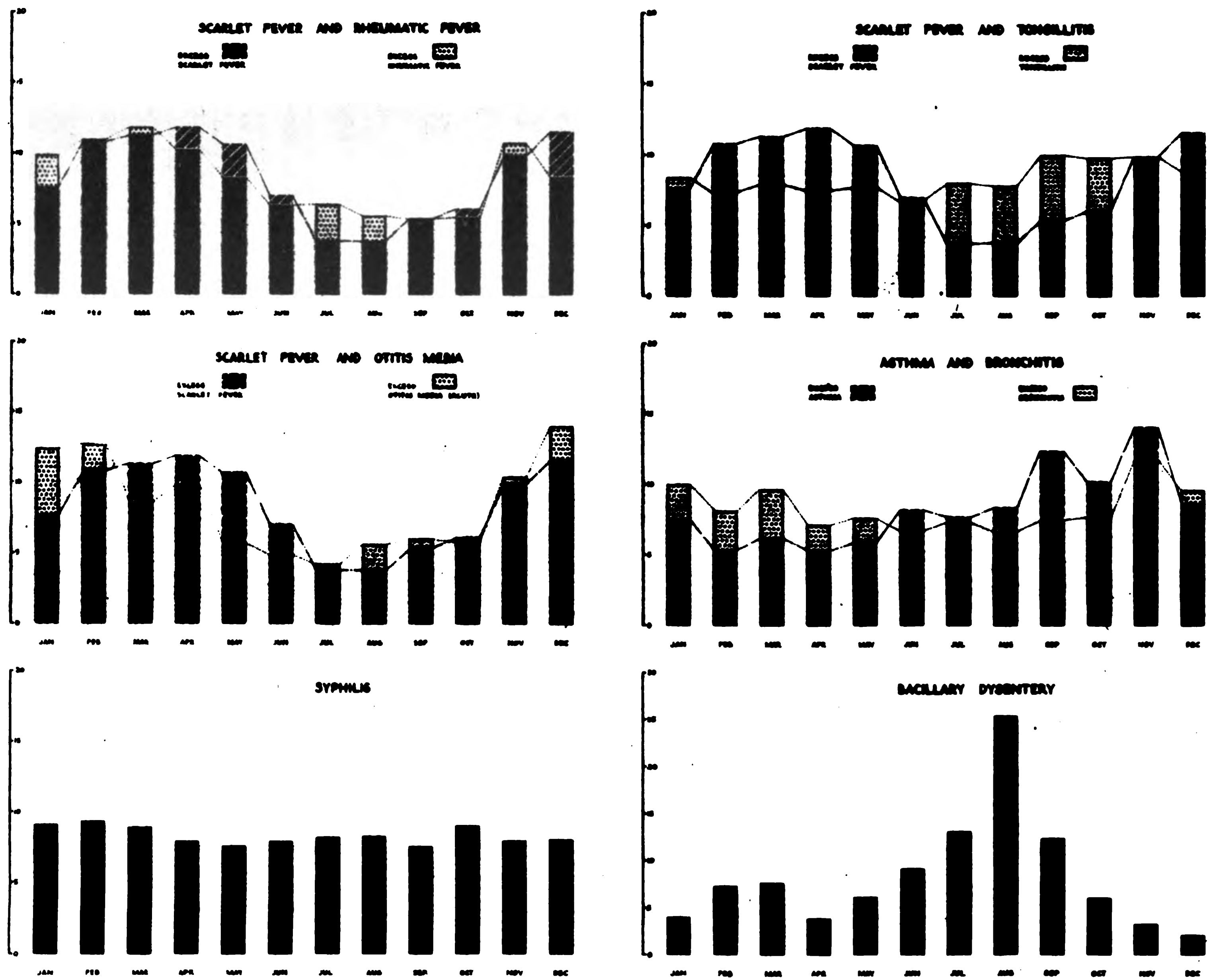
SEX DIFFERENCES W.R.T. WASTAGE

HOSPITAL CASES: U.K. 1943

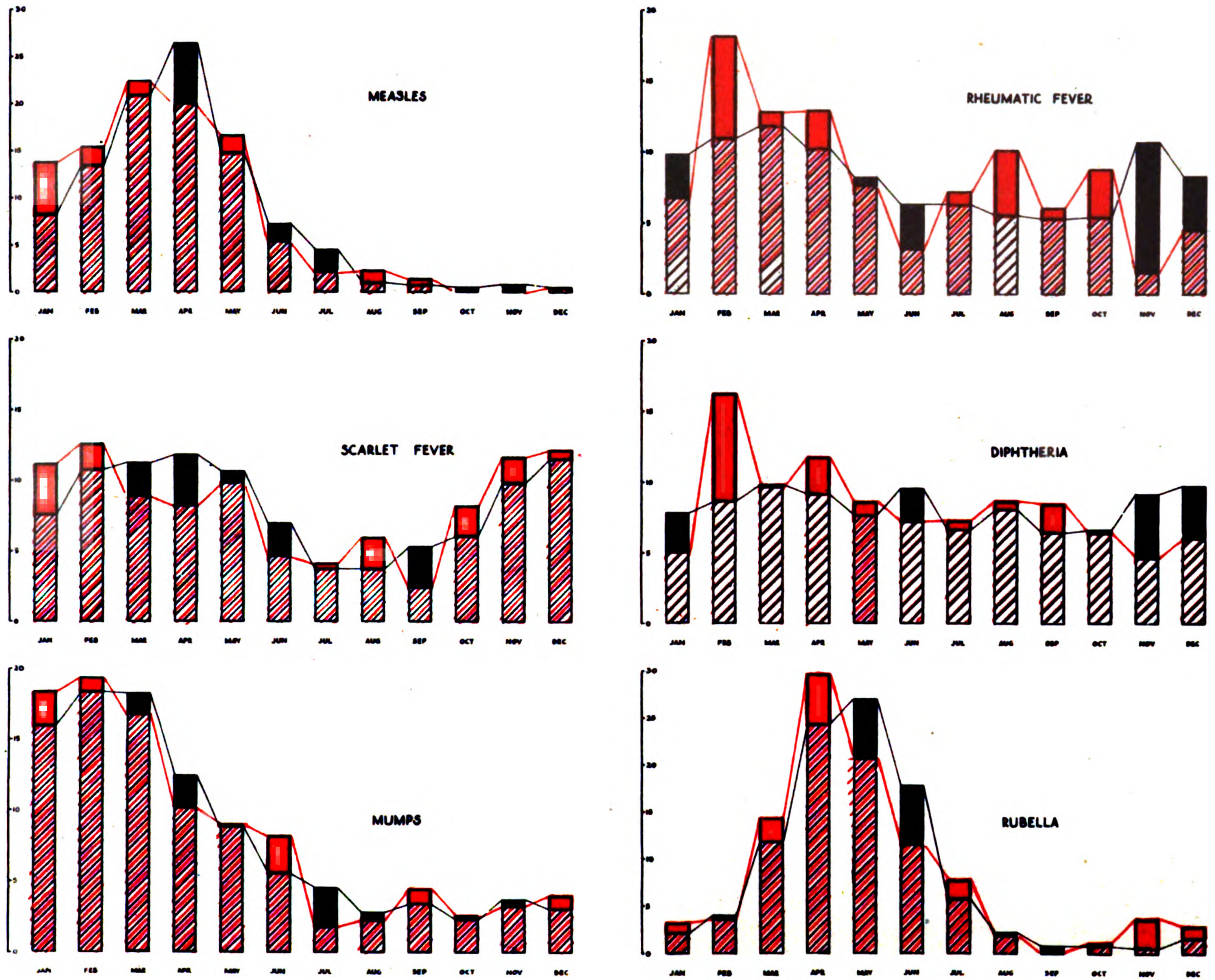


RELATIVE FREQUENCY HOSPITAL ADMISSIONS—U.K. 1943

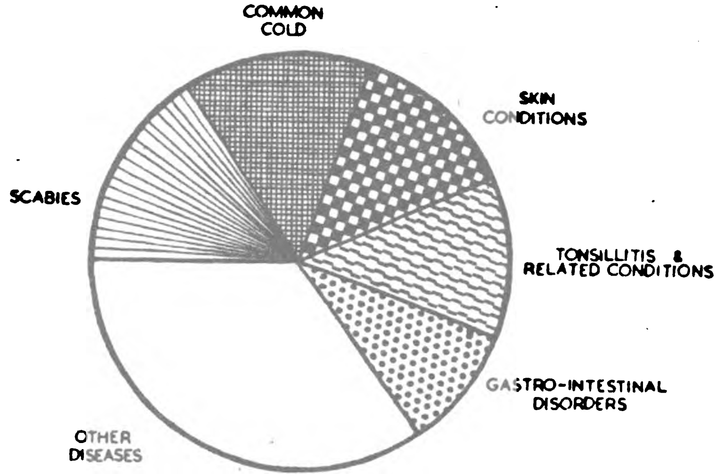
Chart 9

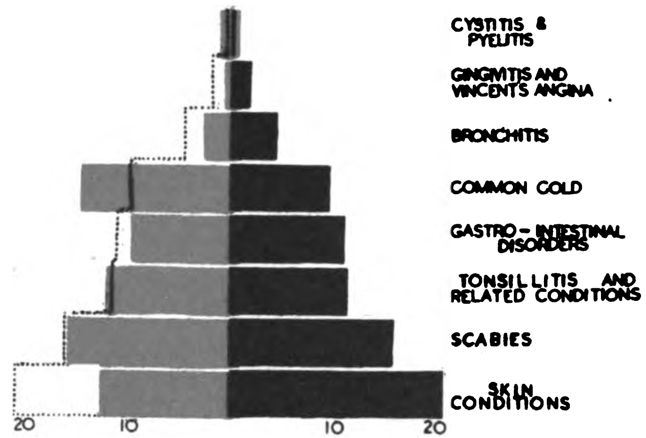


RELATIVE FREQUENCY HOSPITAL ADMISSIONS—U.K. 1943 Chart 10



LOW-GRADE MORBIDITY IN U.K.
R.M.Rs. W.R.T. RECEPTION STATION CASES: 2ND HALF 1942





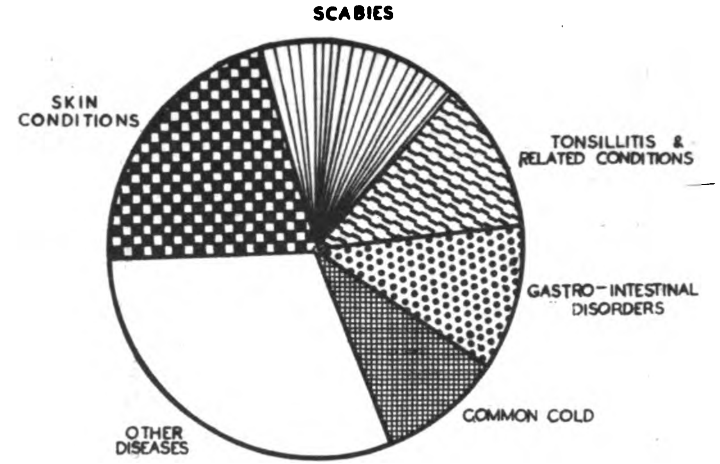
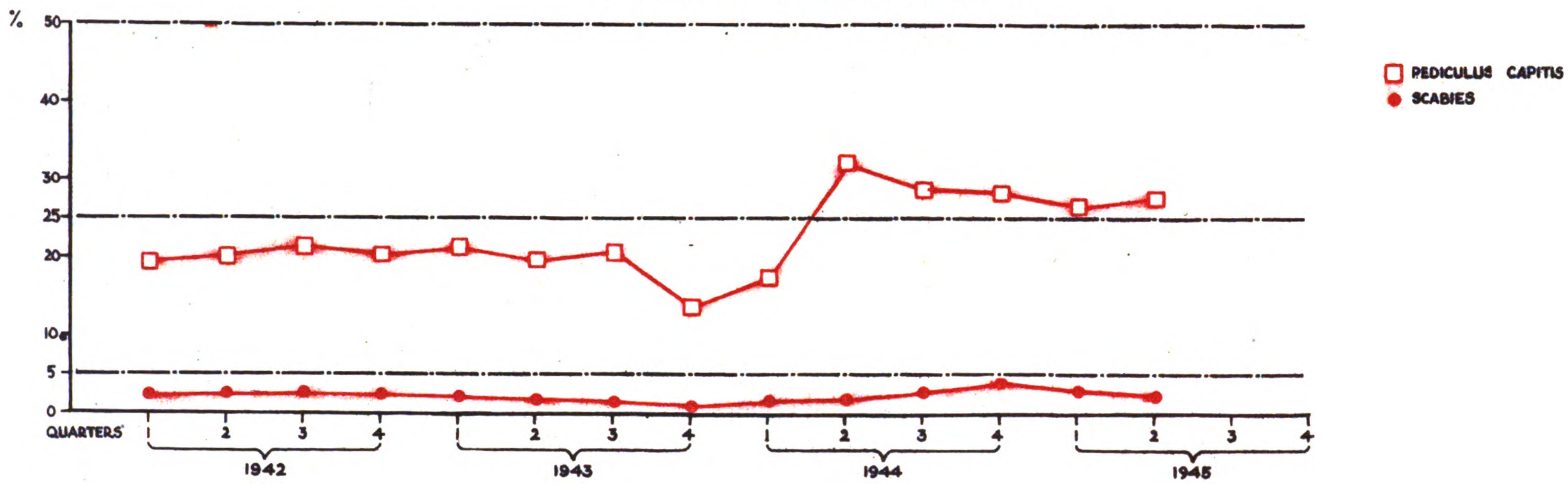


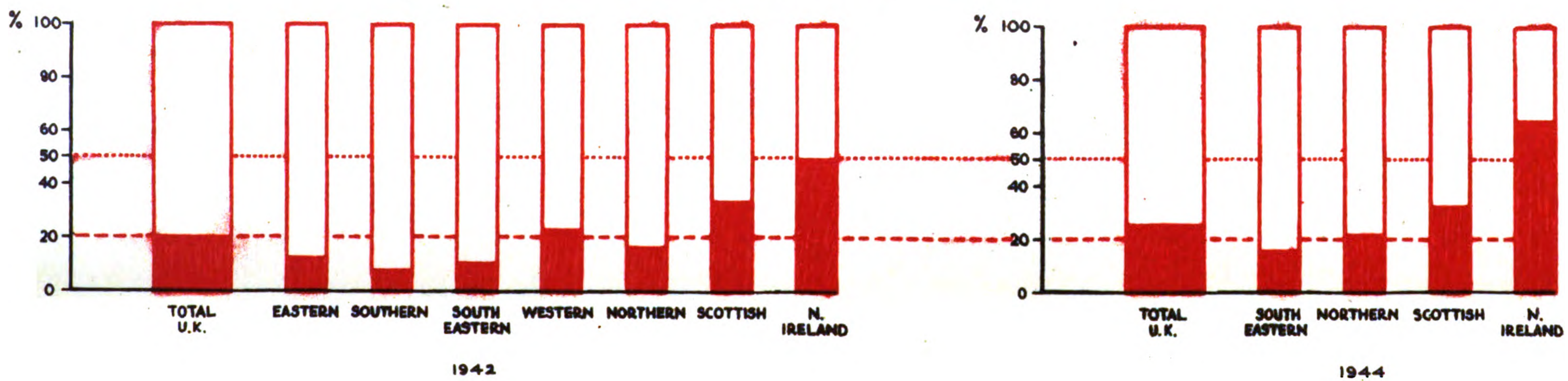
Chart 12

INFESTATIONS AMONG A.T.S. INTAKES

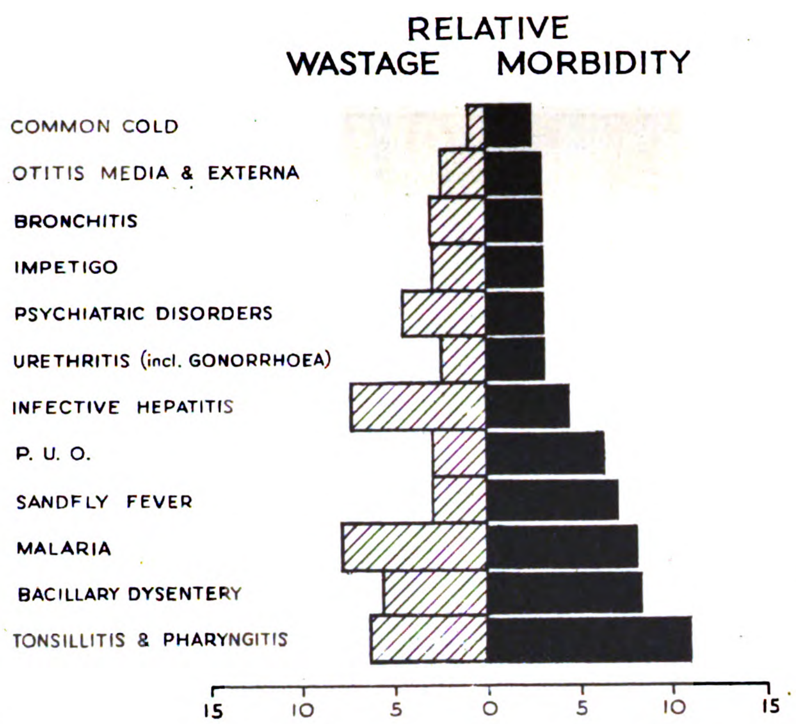
PERCENTAGE OF RECRUITS INFECTED

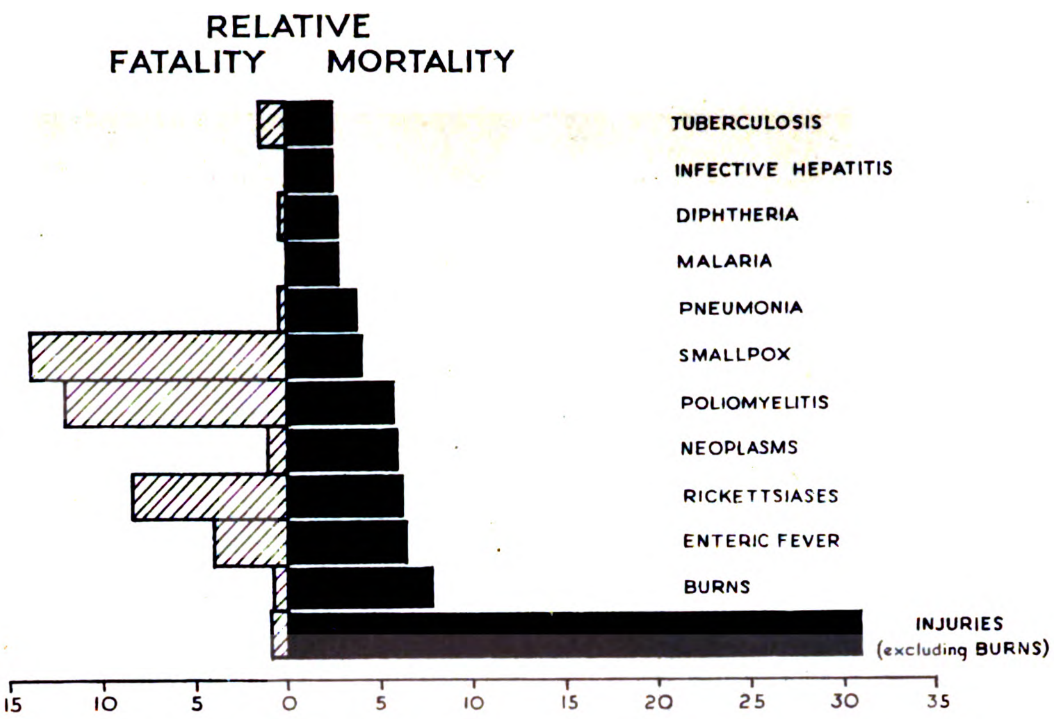


PEDICULUS CAPITIS BY COMMAND

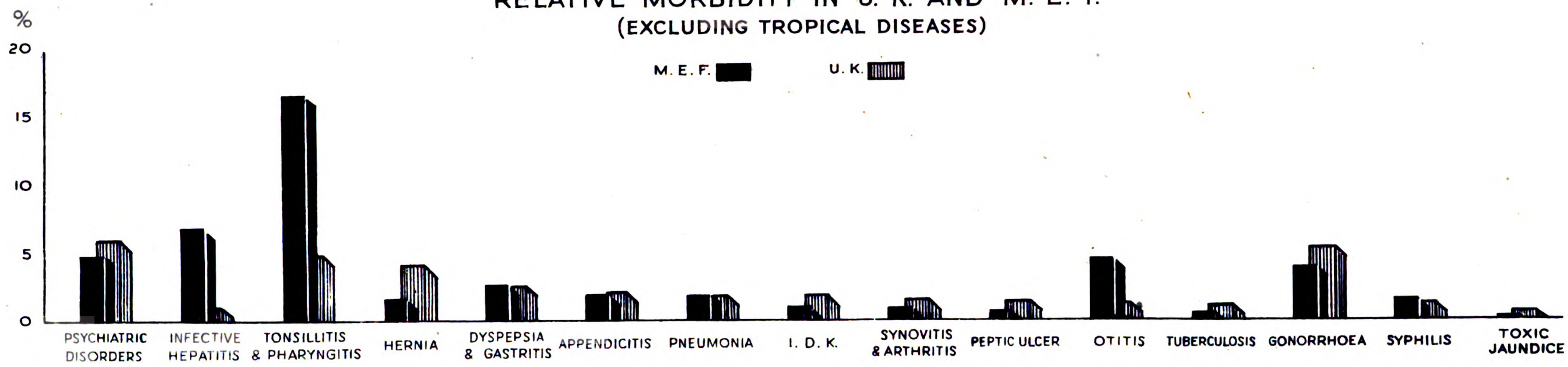


OVERALL MEDICAL WASTAGE IN M.E.F. DURING 1943

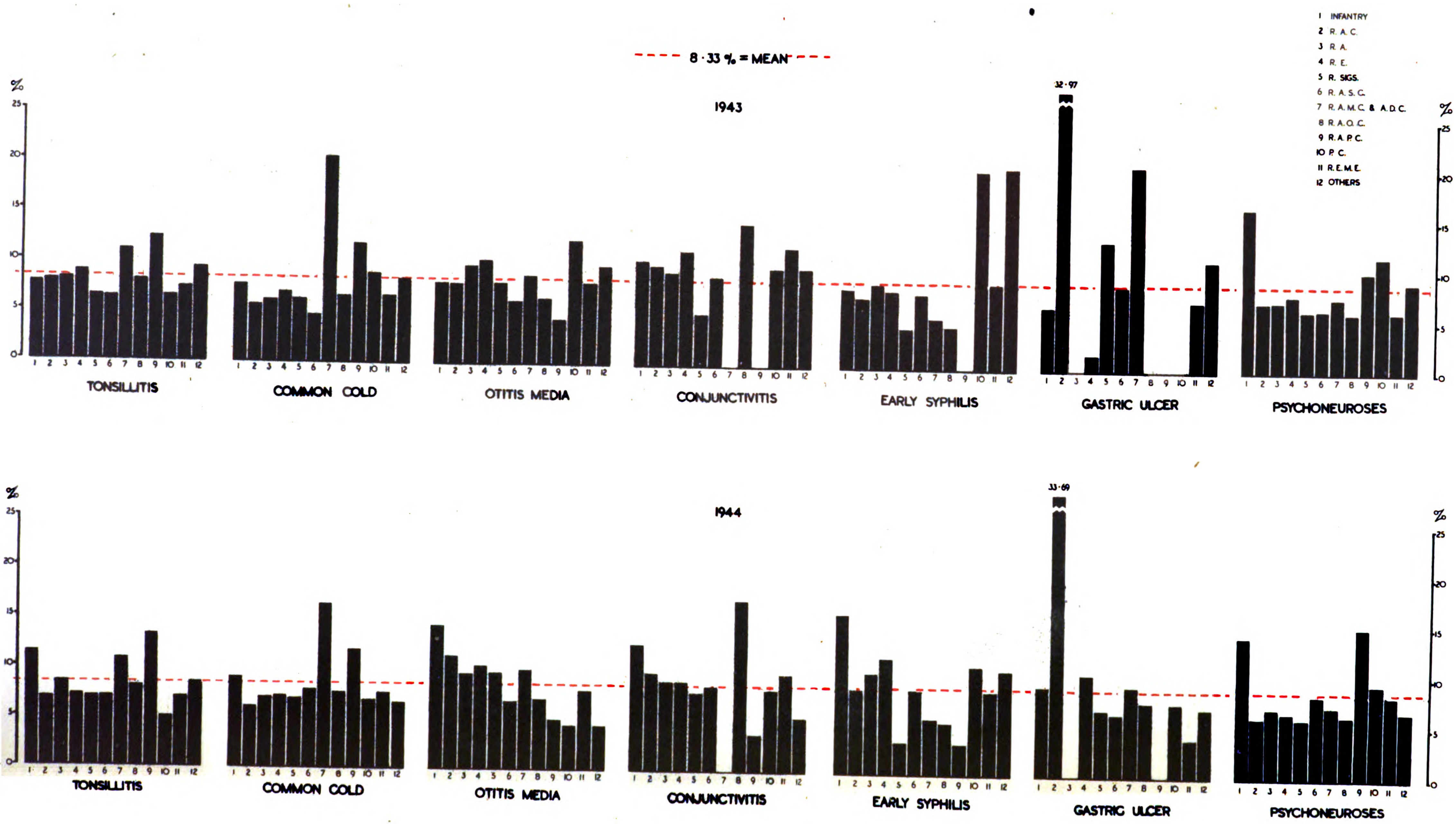




RELATIVE MORBIDITY IN U. K. AND M. E. F.
(EXCLUDING TROPICAL DISEASES)



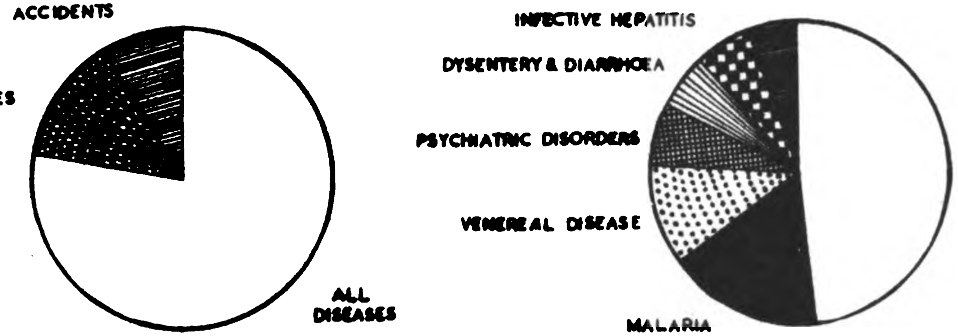
RELATIVE INCIDENCE OF ADMISSIONS TO HOSPITAL BY ARM OF SERVICE IN M.E.F.

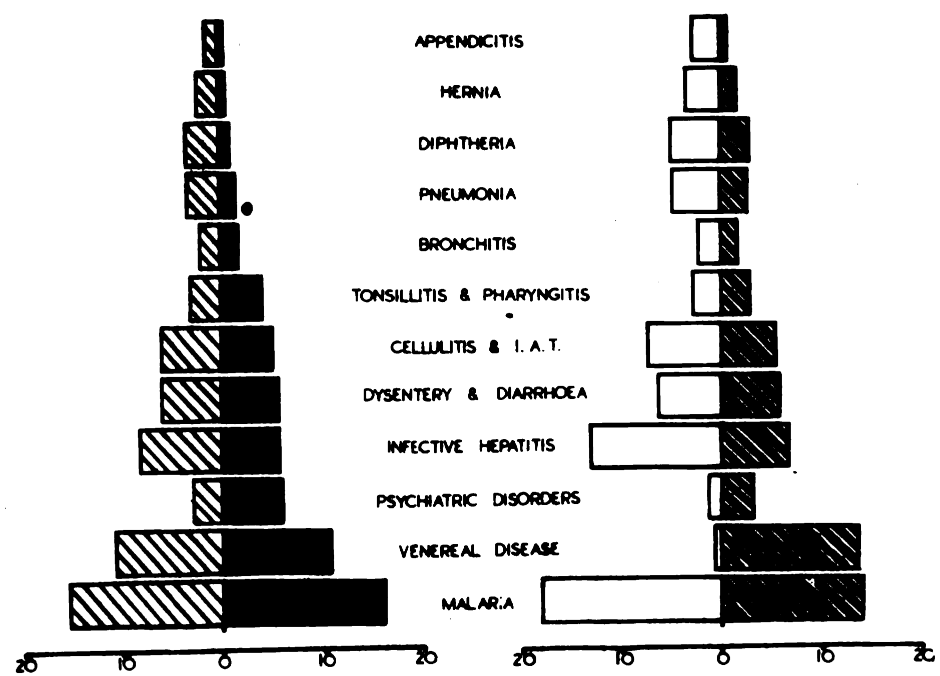


MORBIDITY AND WASTAGE IN MEDICAL UNITS IN ITALY

BRITISH ARMY OTHER RANKS: 1944

RELATIVE CASUALTY & MORBIDITY RATES





MEAN DURATION OF STAY IN MEDICAL UNITS IN ITALY

BRITISH ARMY OTHER RANKS: 1944

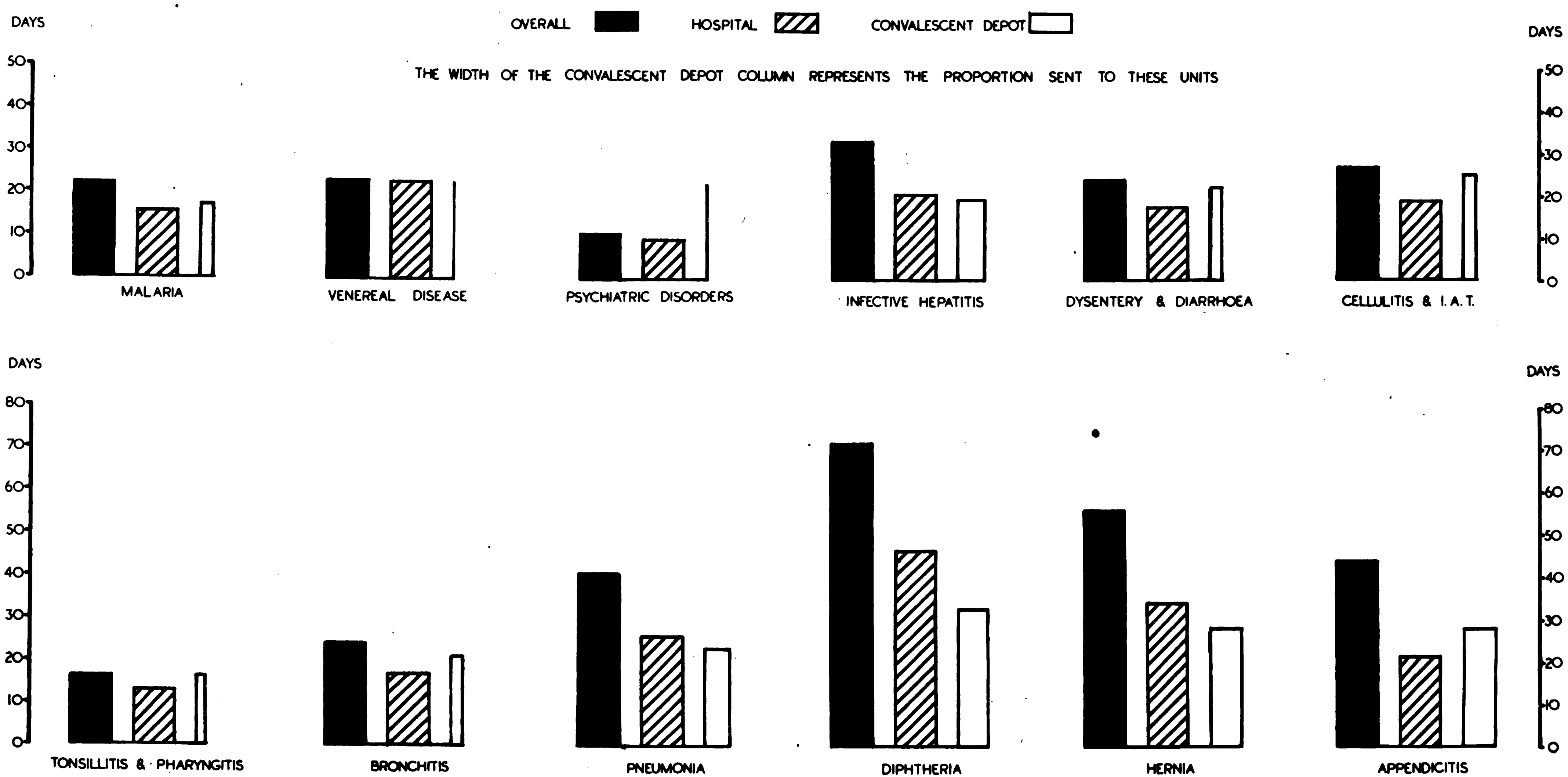


Chart 17

SEASONAL VARIATION OF CERTAIN DISEASES IN ITALY

RELATIVE MONTHLY RATES: BRITISH ARMY OTHER RANKS: 1944

FOR MORE DETAILED EXPLANATION OF THESE HISTOGRAMS, SEE TEXT

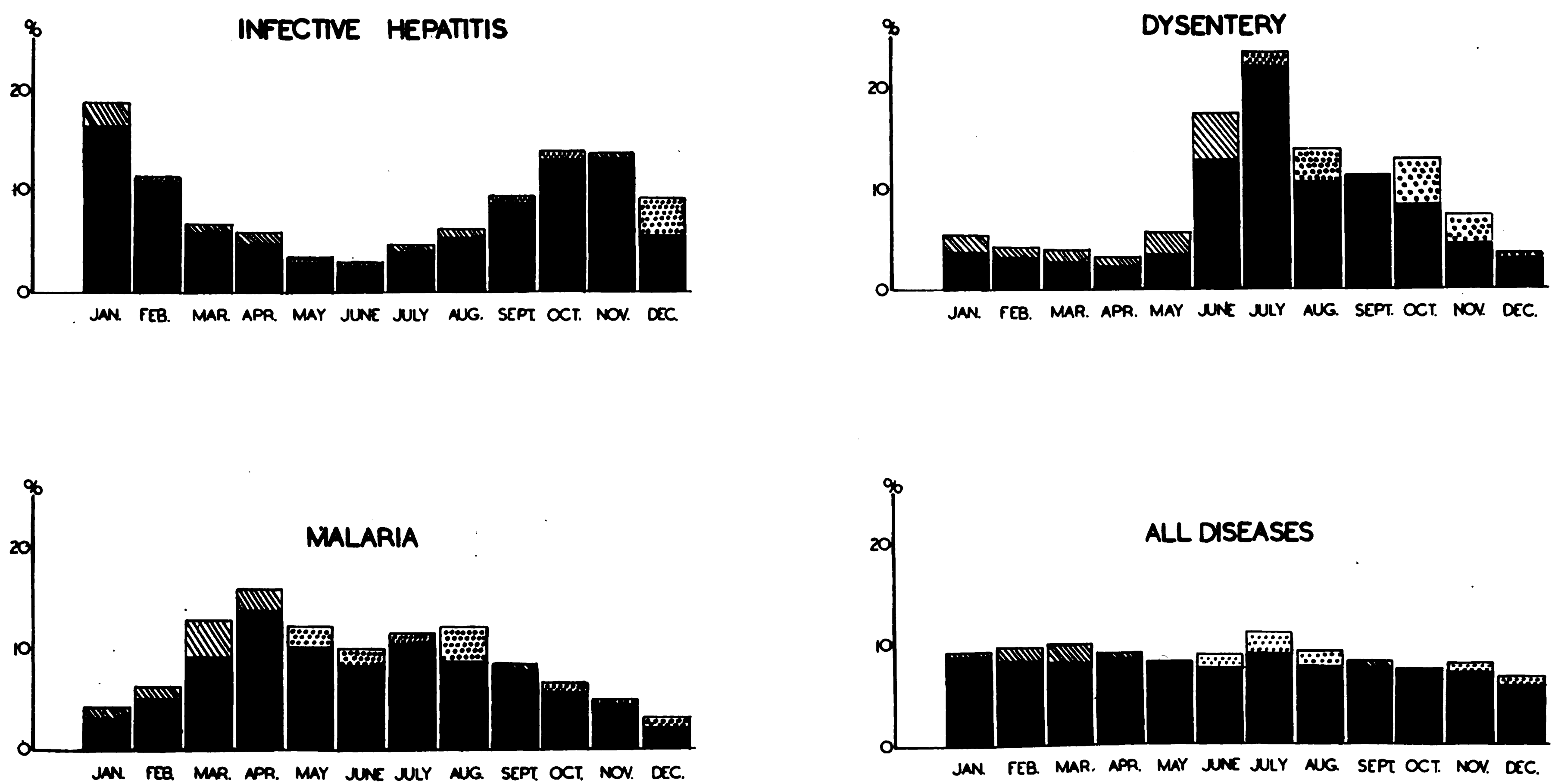
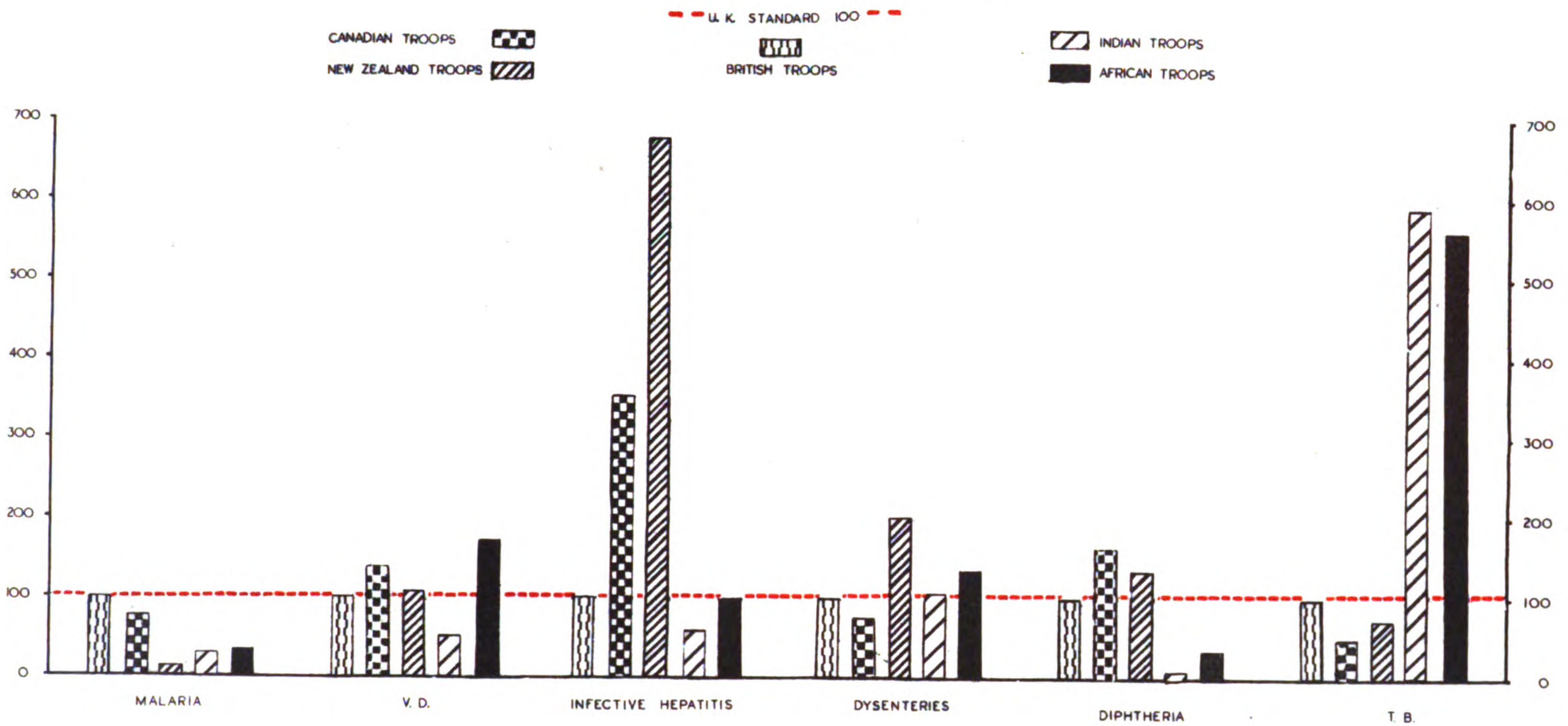
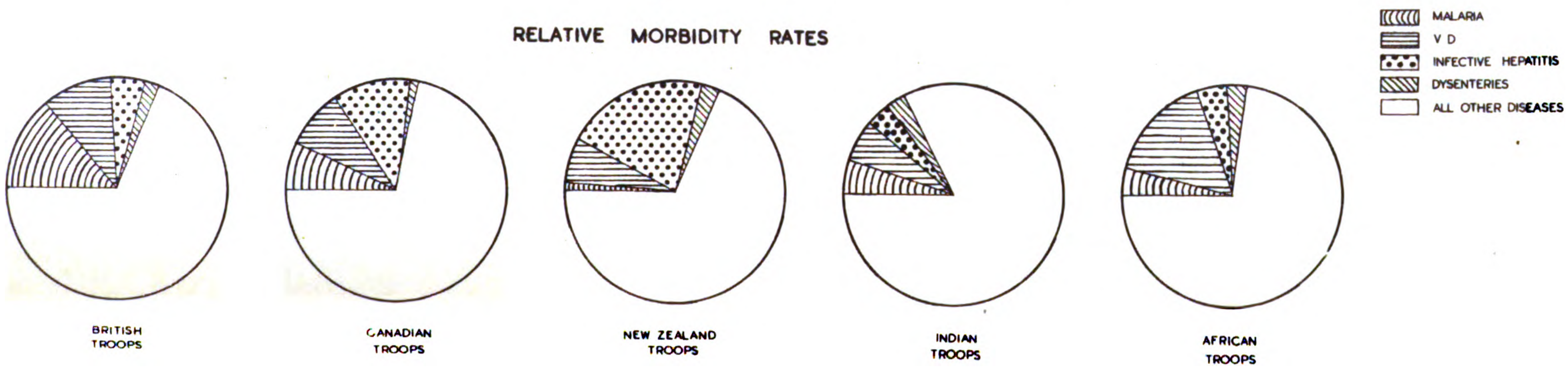


Chart 18

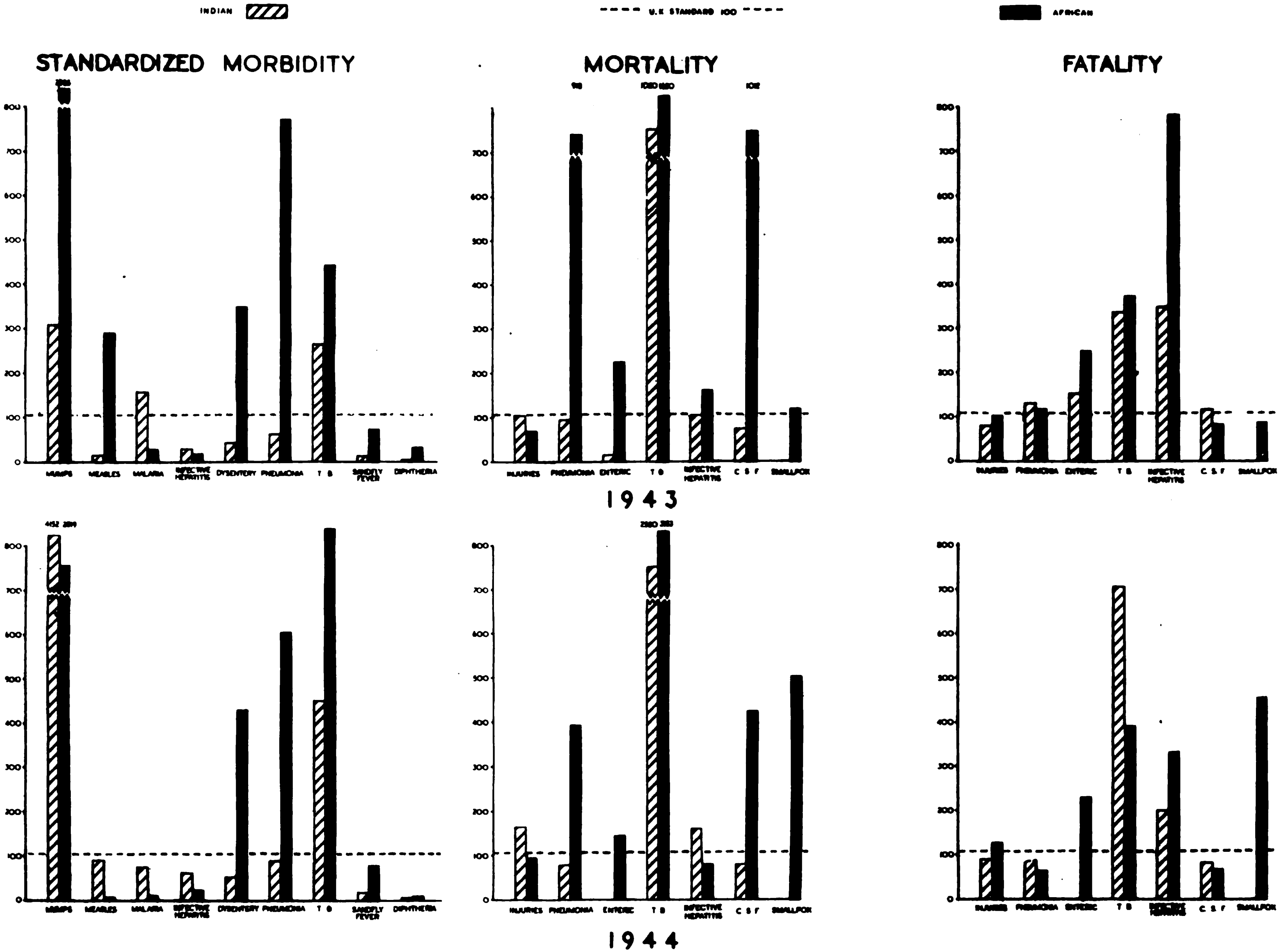
ITALY AND SICILY—1944
COMPARATIVE MORBIDITY RATES



RELATIVE MORBIDITY RATES

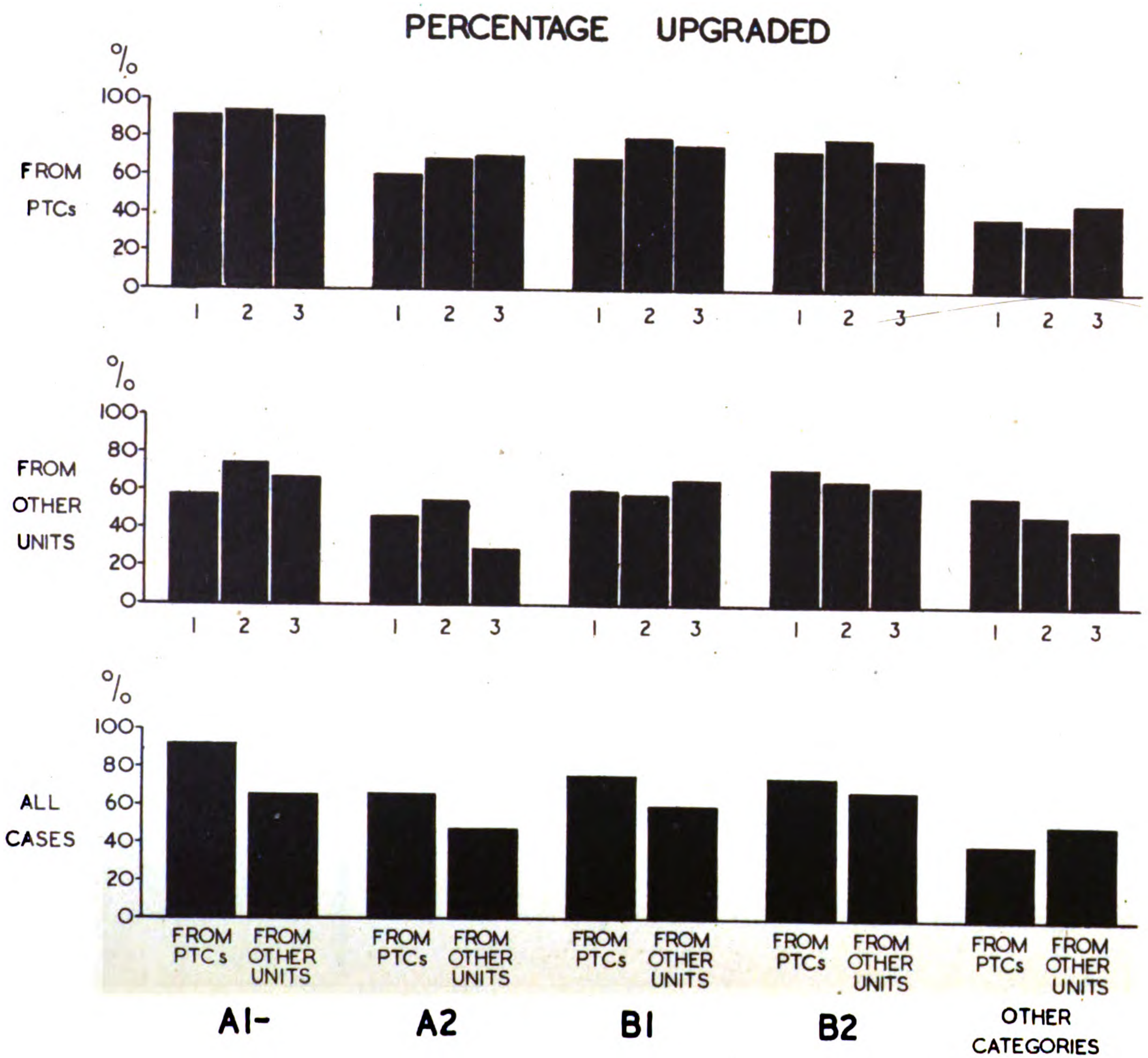


COMPARATIVE RATES
MIDDLE EAST: 1943 AND 1944

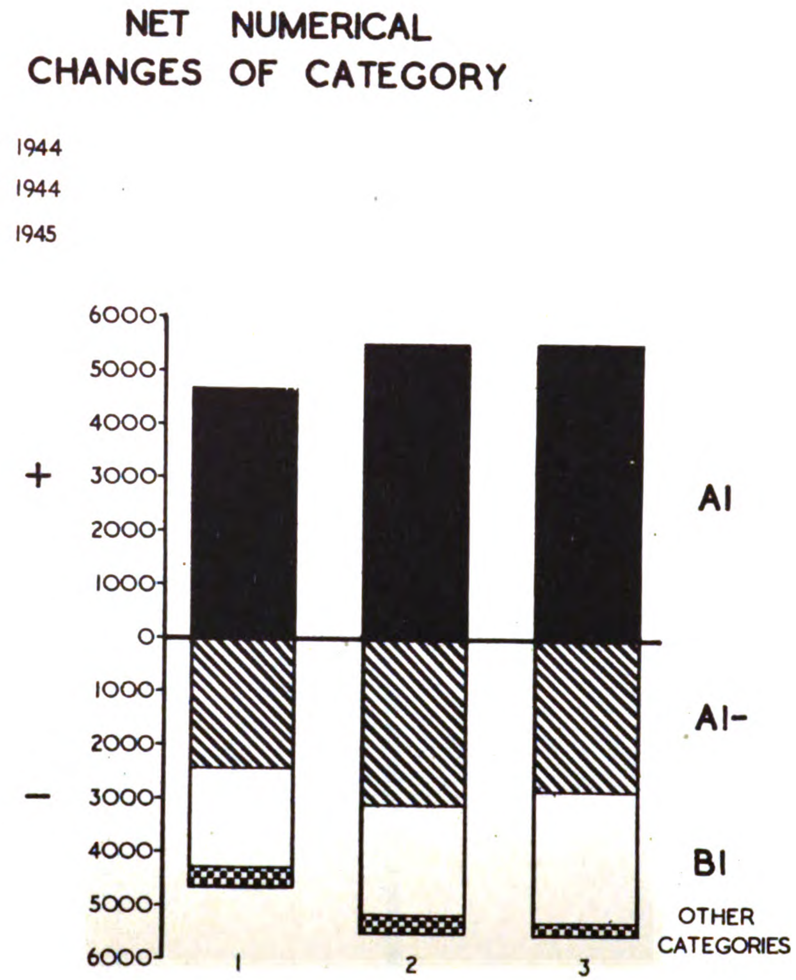


MEDICAL RECATEGORIZATION IN PHYSICAL DEVELOPMENT CENTRES

JANUARY, 1944 - JUNE, 1945



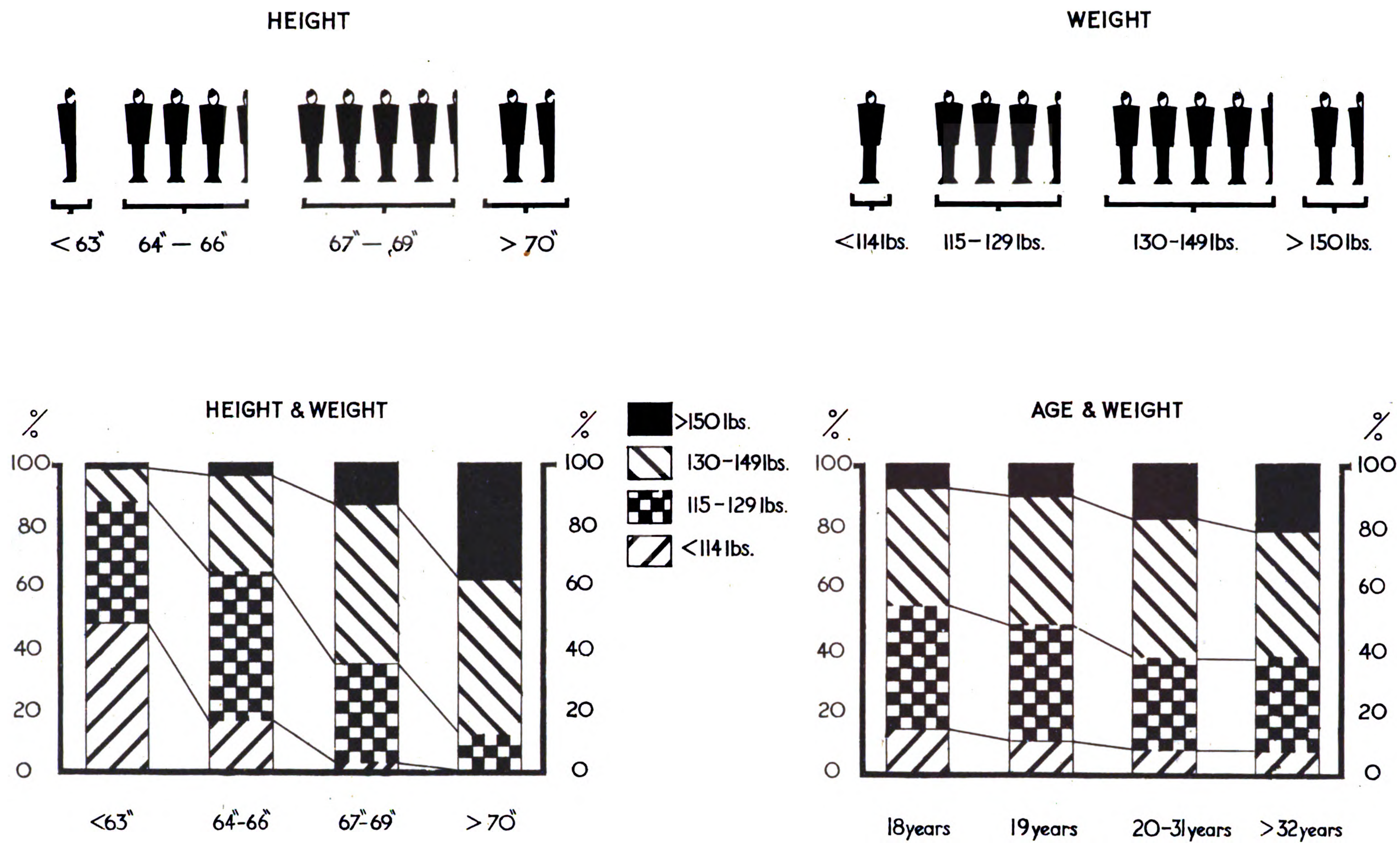
1 = 1st HALF 1944
2 = 2nd HALF 1944
3 = 1st HALF 1945



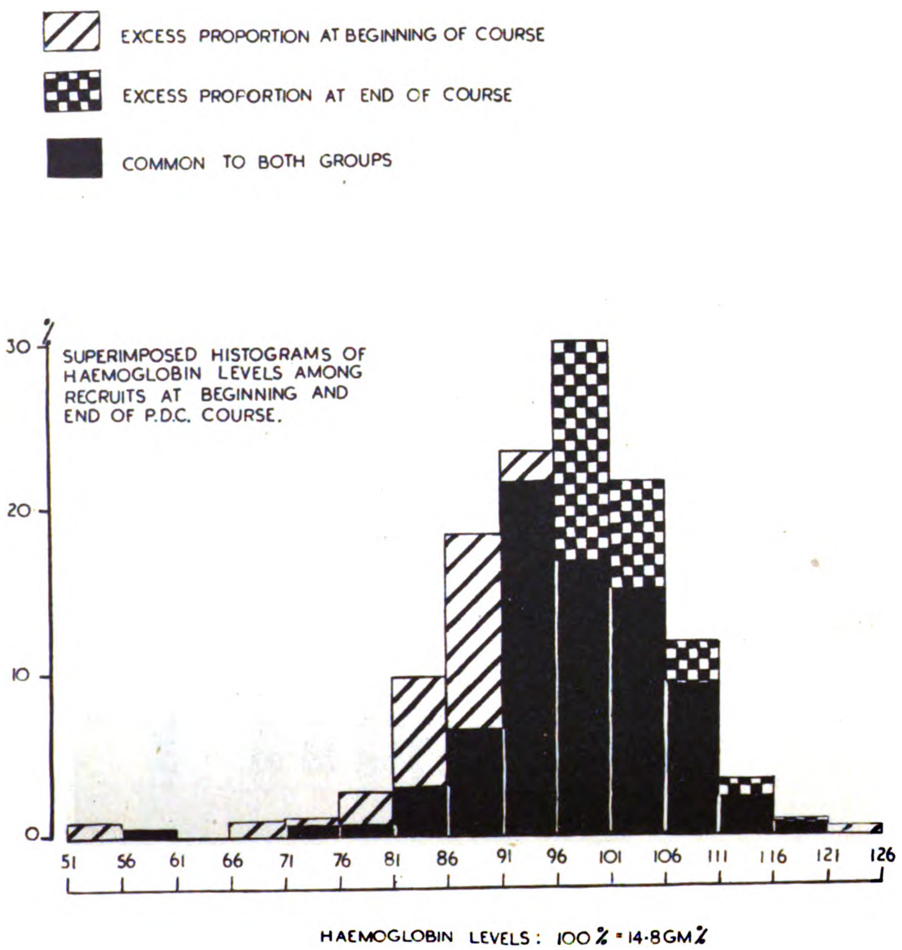
HEIGHTS AND WEIGHTS OF ARMY INTAKES

1942-1945

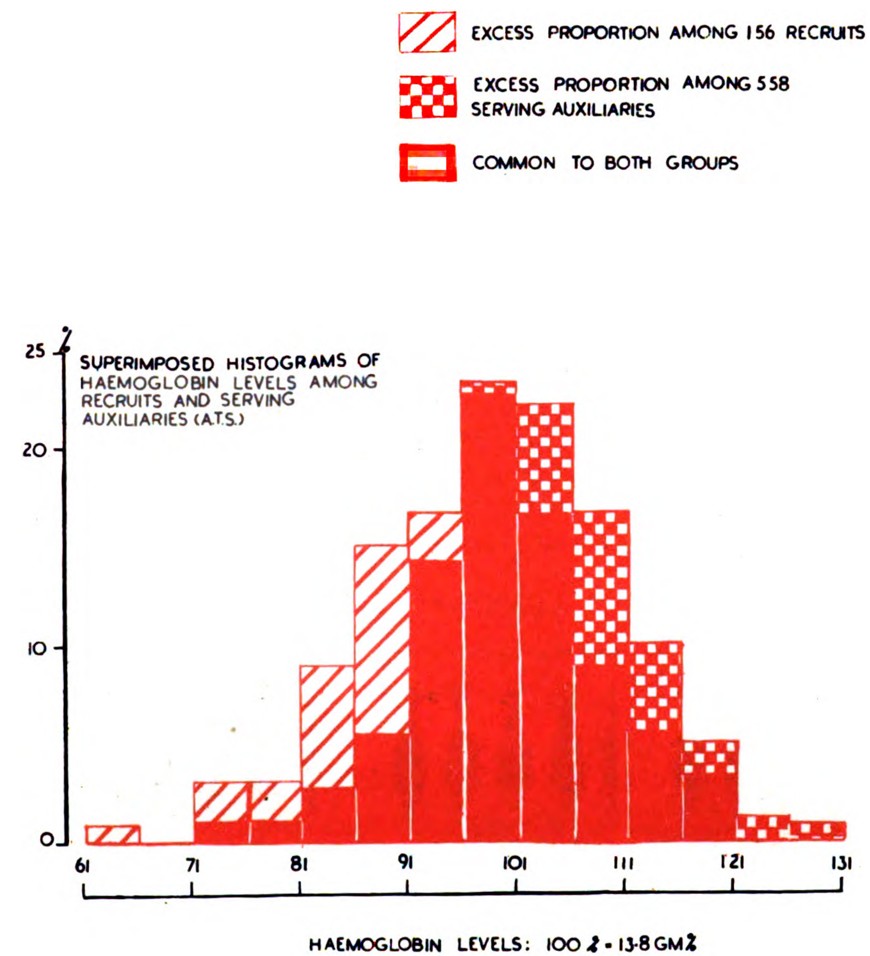
Chart 21



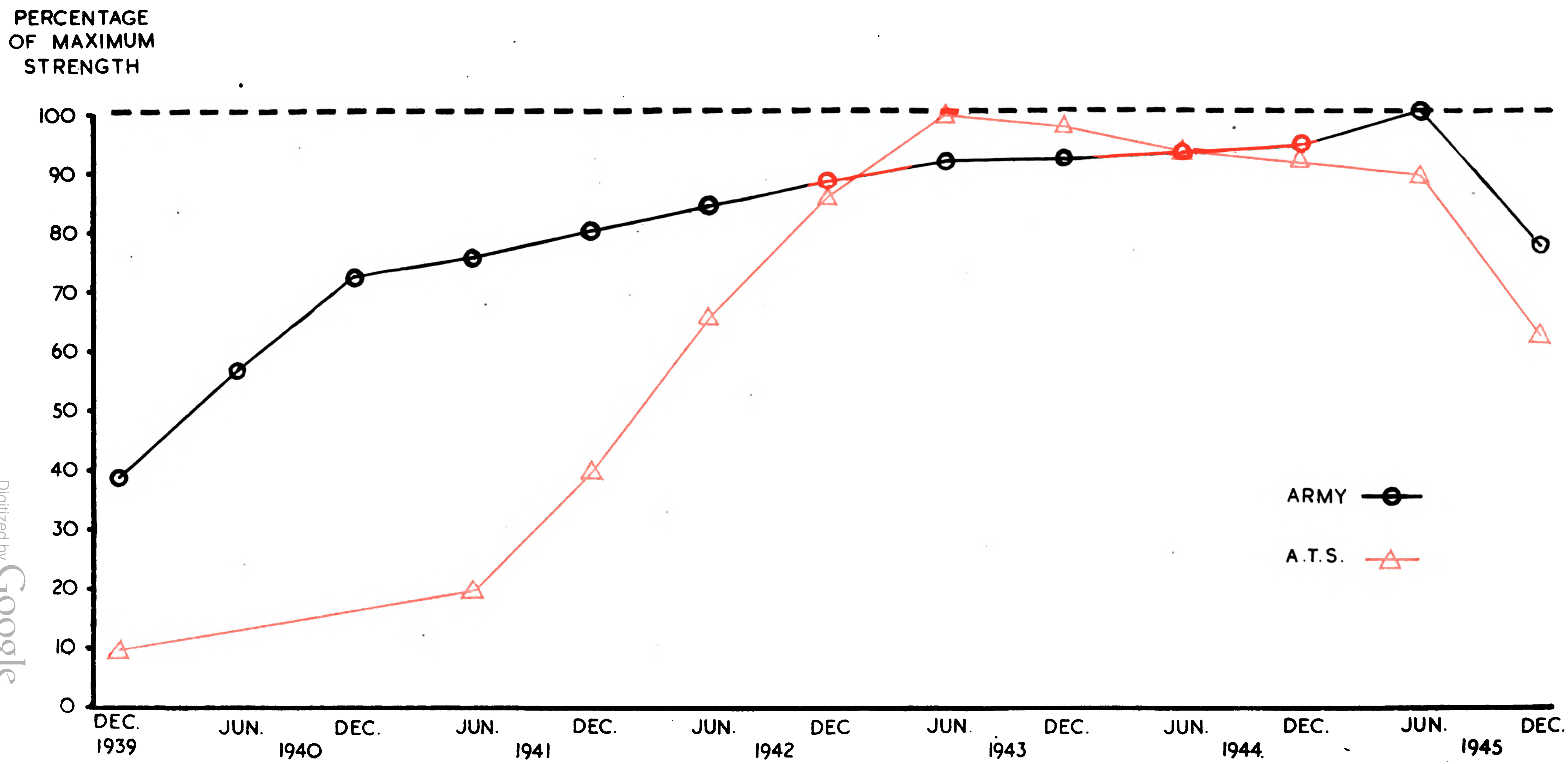
HAEMOGLOBIN LEVELS IN 630 RECRUITS AT BEGINNING AND END OF P.D.C. COURSE



A.T.S. HAEMOGLOBIN LEVELS AMONG RECRUITS AND SERVING AUXILIARIES

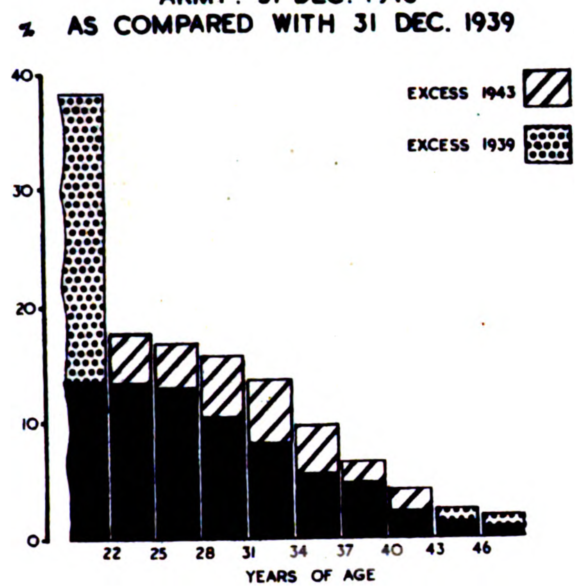


GROWTH OF ARMY—1939-1945

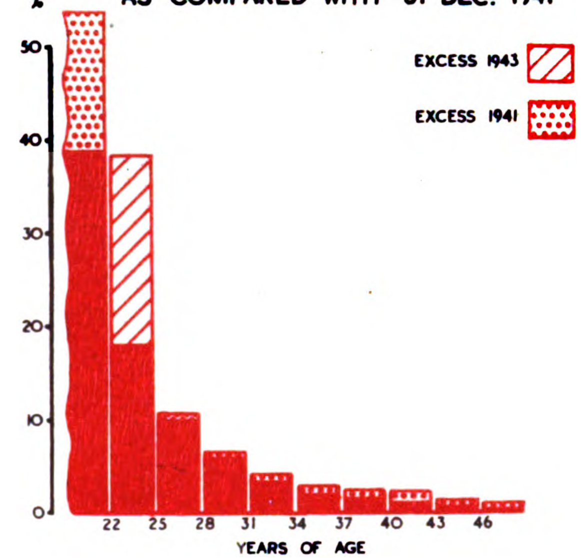


AGE DISTRIBUTIONS OF RELATIVE STRENGTHS

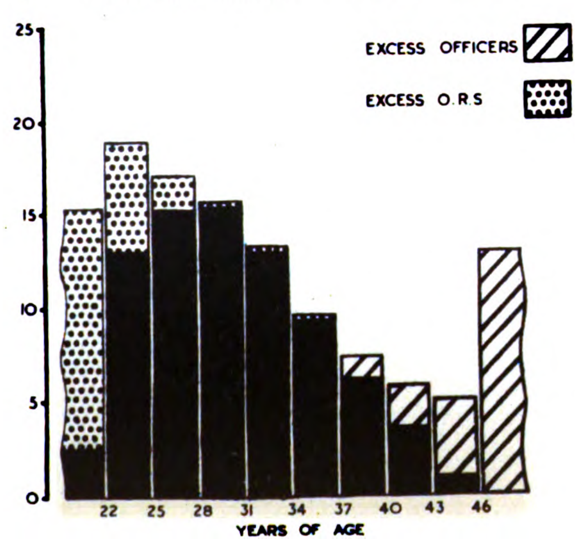
ARMY: 31 DEC. 1943
AS COMPARED WITH 31 DEC. 1939



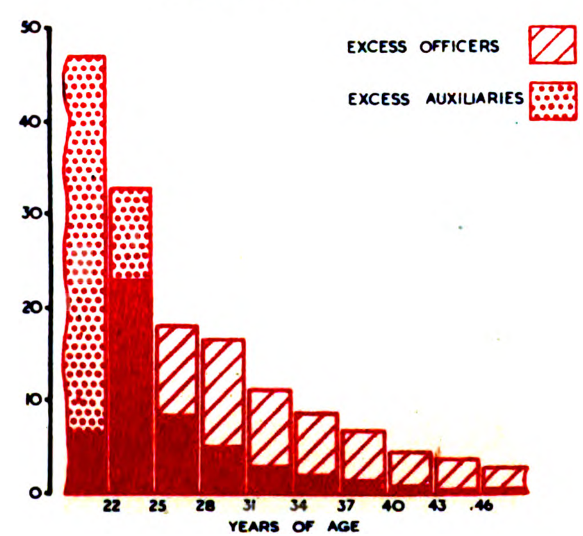
A.T.S: 31 DEC. 1943
AS COMPARED WITH 31 DEC. 1941



OFFICERS & OTHER RANKS
(BRITISH ARMY – JUNE 1943)

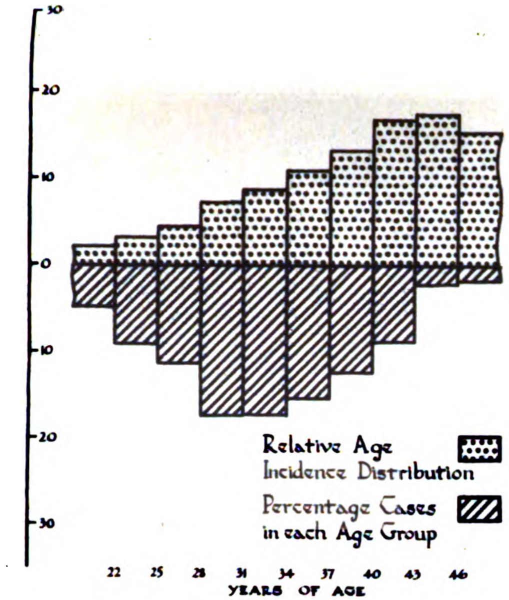


OFFICERS & AUXILIARIES
(A.T.S. – JUNE 1943)

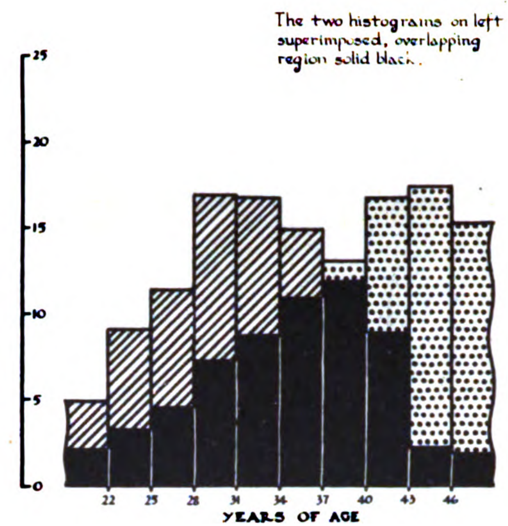


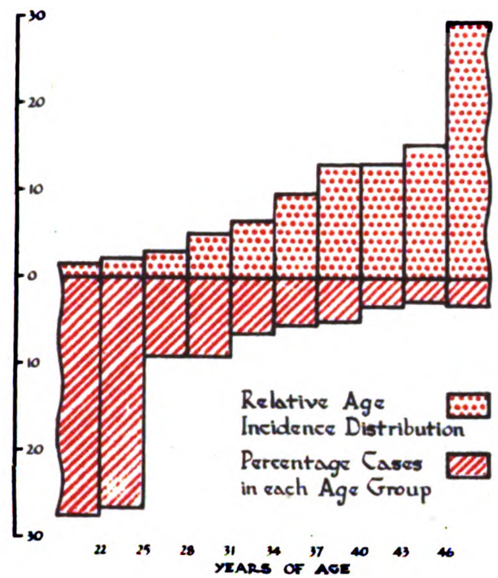
DISCHARGES (O.Rs.)—1943

Chart 25

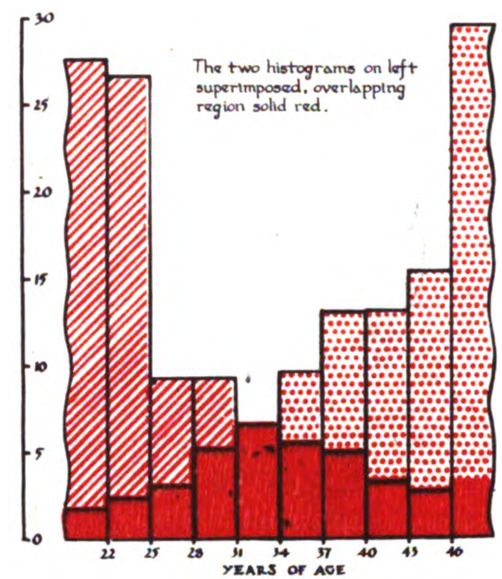


DUODENAL ULCER
(MALES)
(4665 CASES)





ANXIETY STATE
(FEMALES)
(636 CASES)

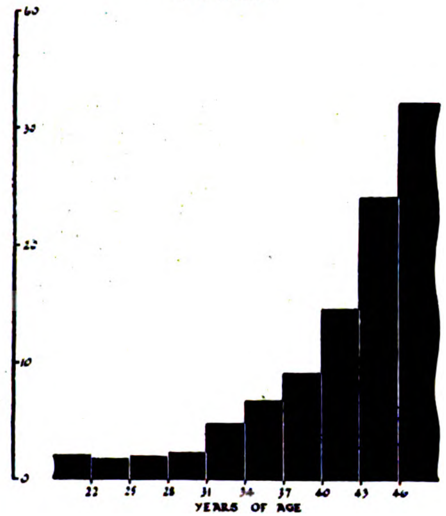


DISCHARGES MILITARY (O.Rs.)—1943

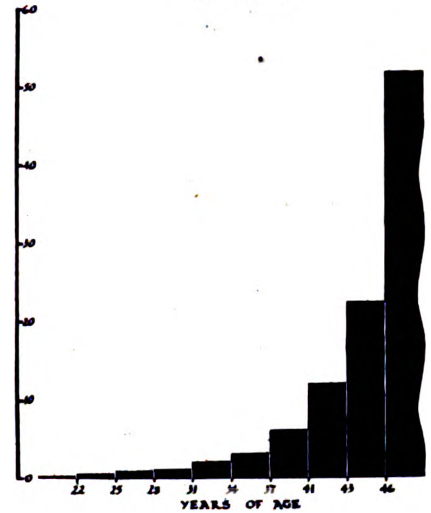
RELATIVE AGE-INCIDENCE DISTRIBUTION

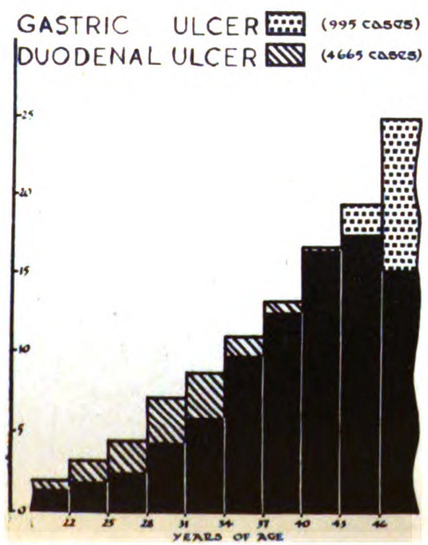
Chart 26

MALIGNANT NEOPLASMS
(349 cases)

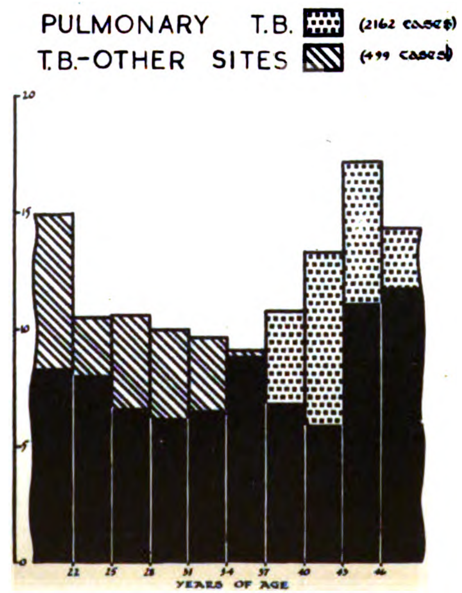


CHRONIC BRONCHITIS
(2181 cases)



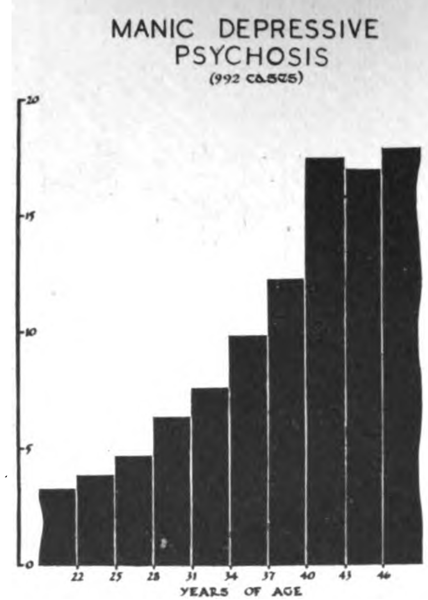


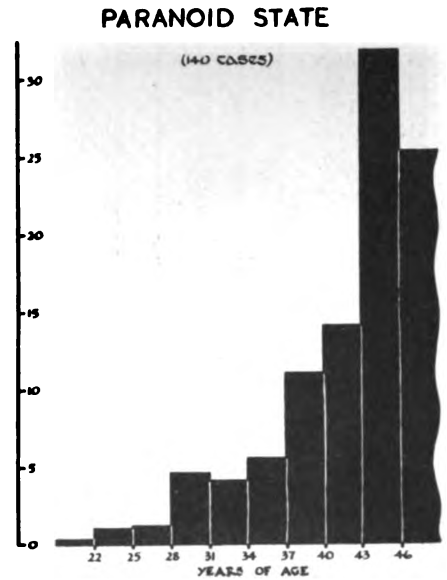
<u>Below</u>: Superimposed histograms, overlapping regions black.

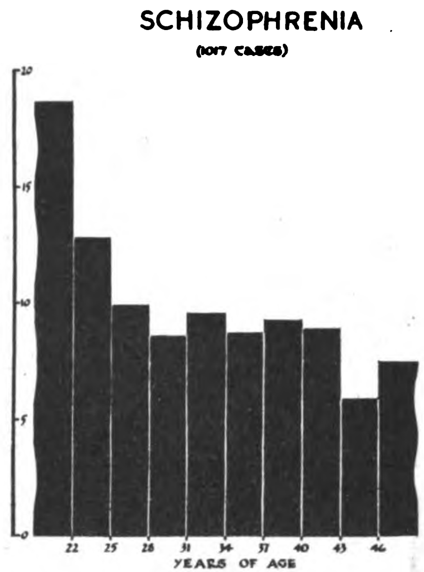


DISCHARGES MILITARY (O.Rs.)—1943 Chart 27

RELATIVE AGE-INCIDENCE DISTRIBUTION







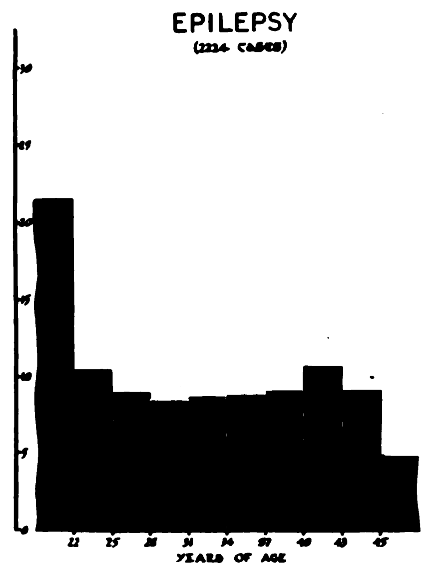
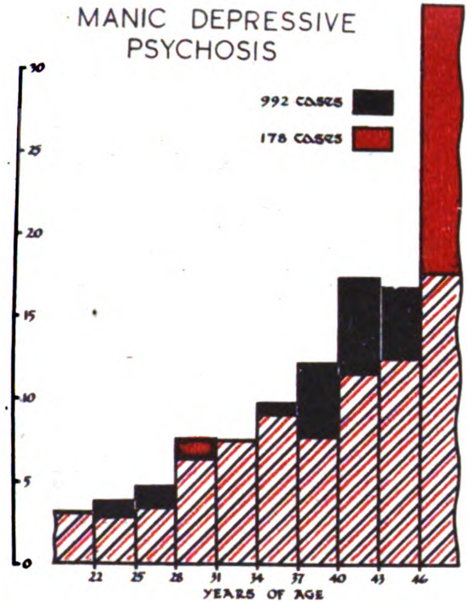


Chart 28

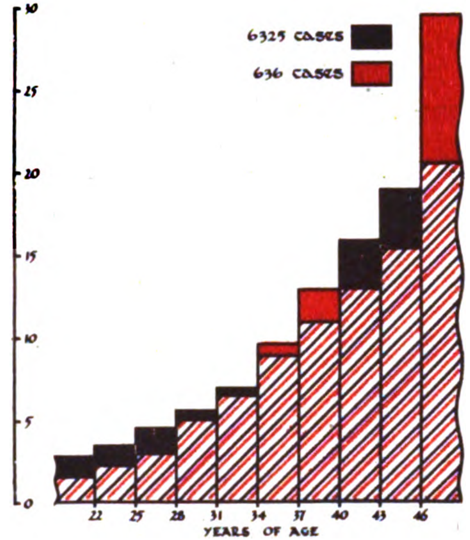
DISCHARGES (O.Rs.)—1943

SUPERIMPOSED HISTOGRAMS
MALE (SOLID BLACK)
FEMALE (SOLID RED)
OVERLAPPING REGIONS SHADED IN BLACK-RED.

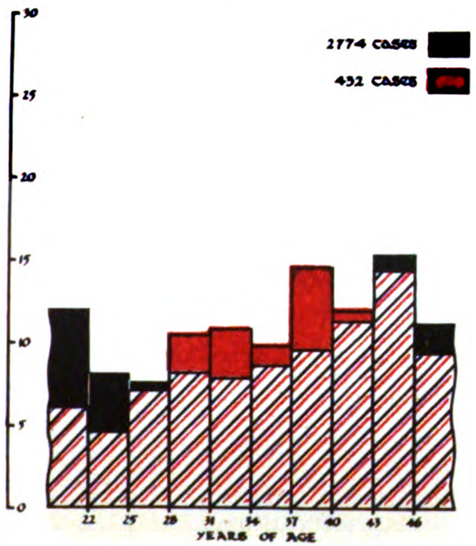
MANIC DEPRESSIVE PSYCHOSIS



ANXIETY STATE



PSYCHOPATHIC PERSONALITY



T. B. ALL

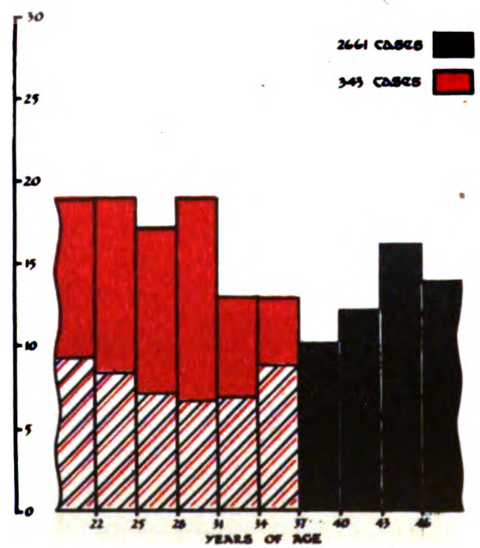
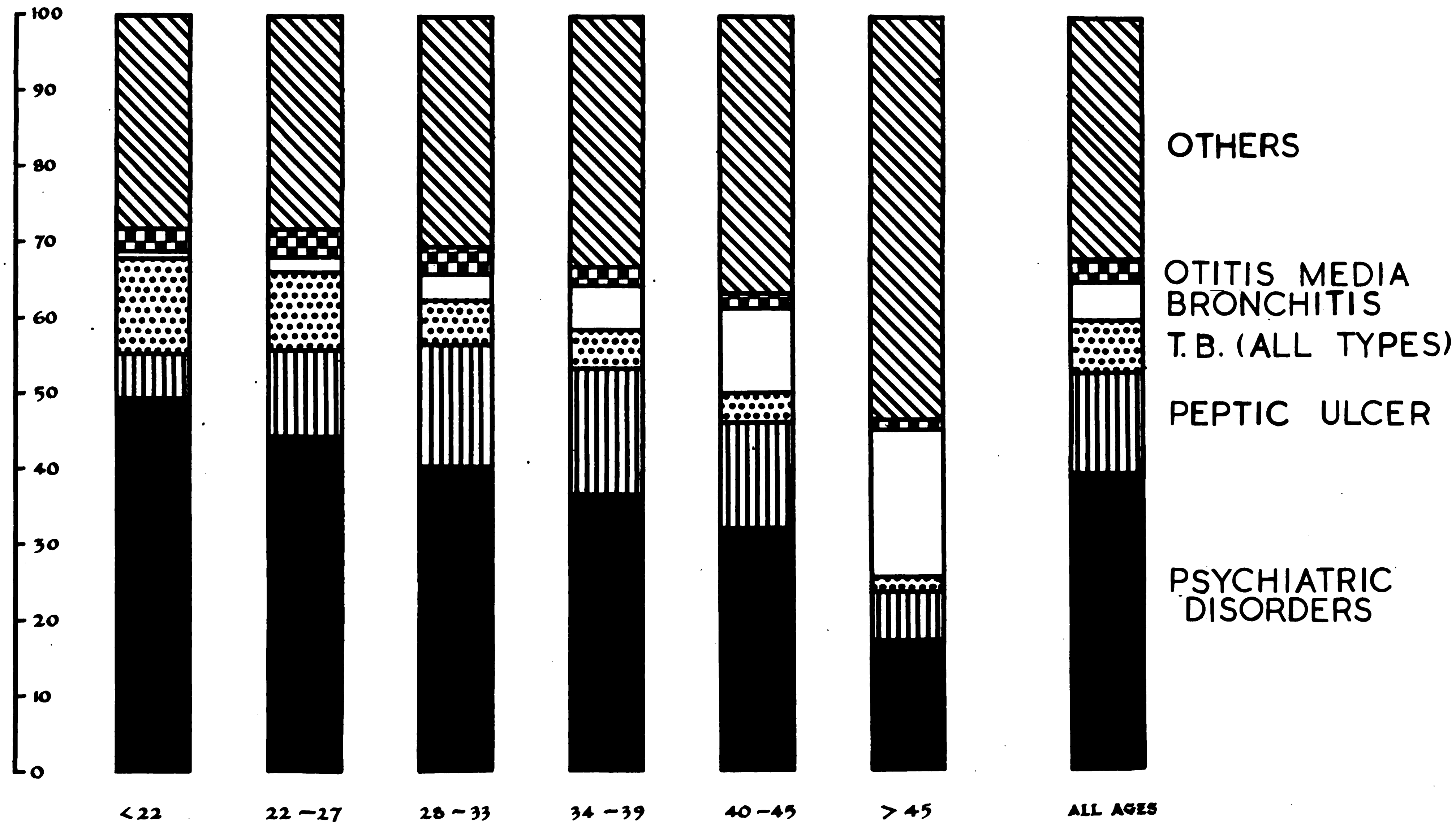


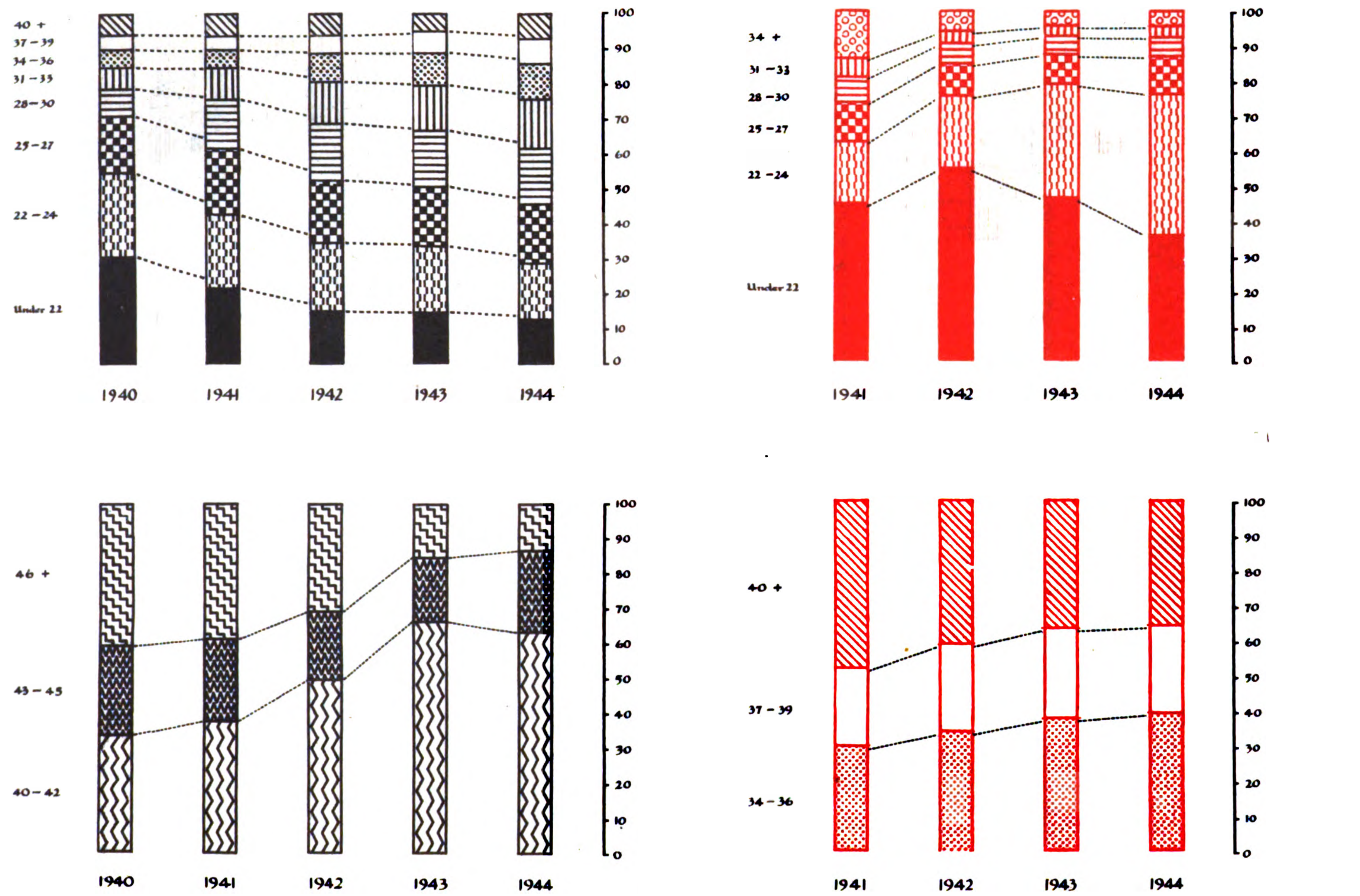
Chart 29

RELATIVE DISCHARGE RATES—1943
WITH RESPECT TO SICKNESS AT DIFFERENT AGES

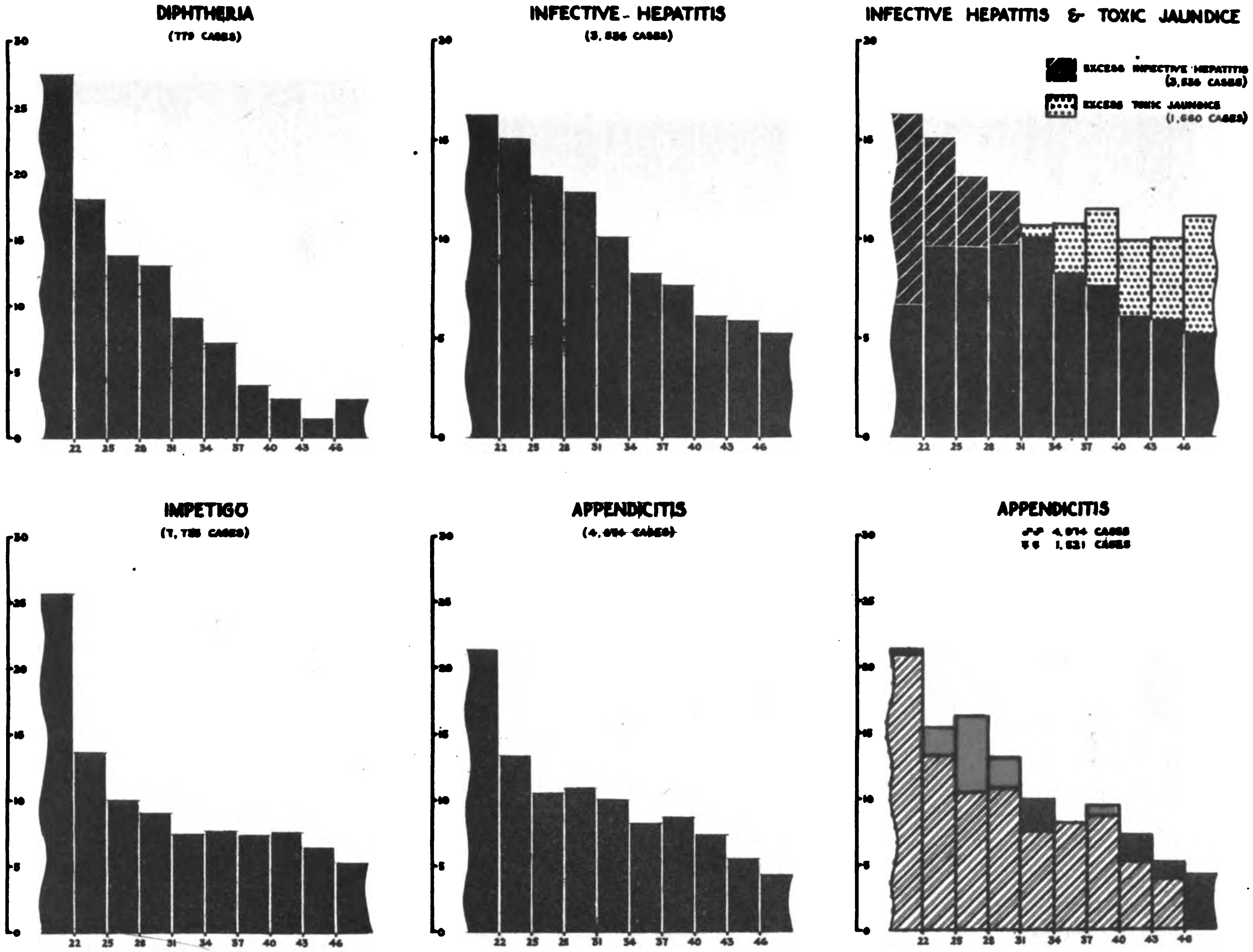


CHANGES OF RELATIVE AGE COMPOSITION

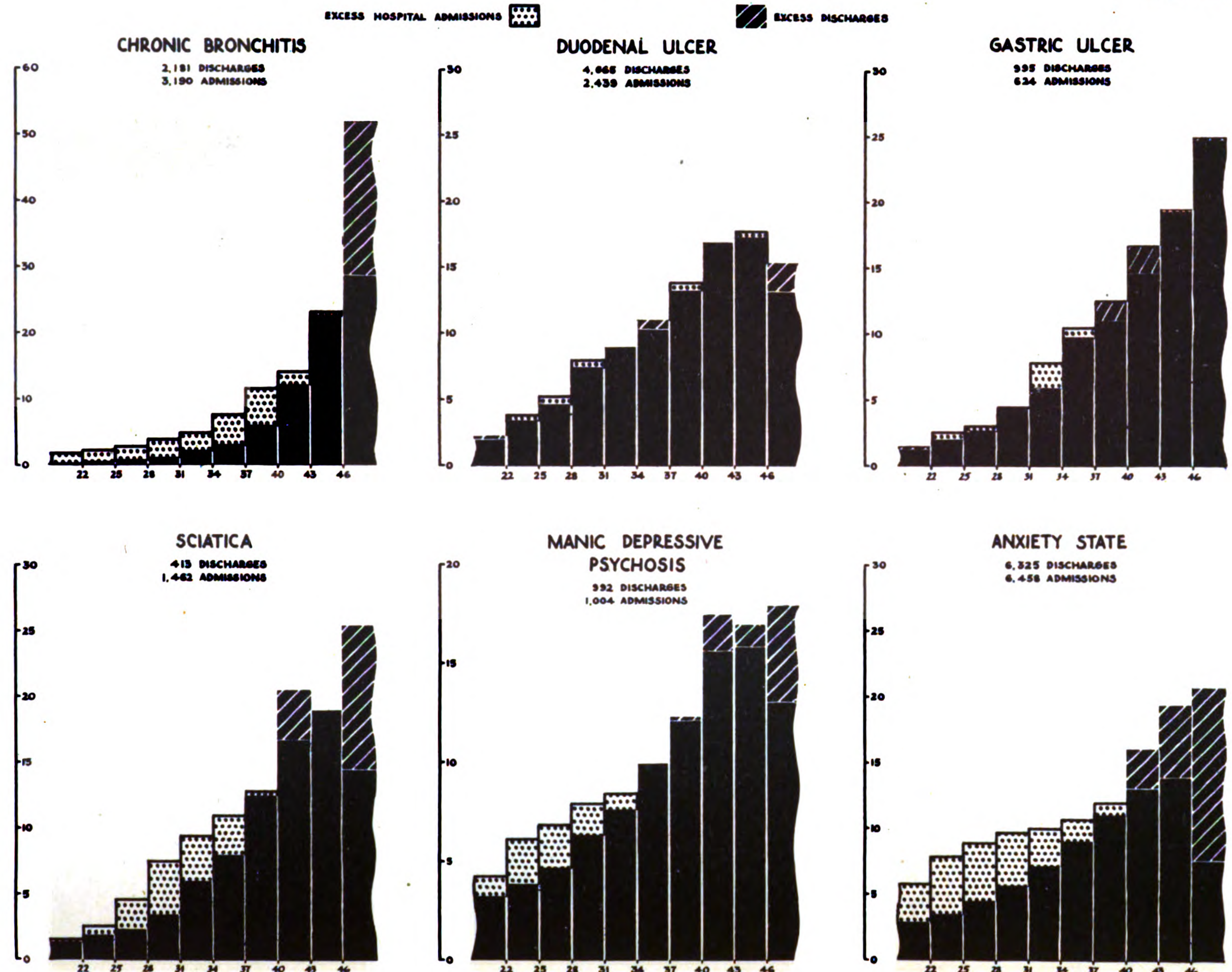
Chart 30



AGE AND WASTAGE—HOSPITAL ADMISSIONS—U.K. 1943



AGE AND WASTAGE—U.K. 1943



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AGE AND WASTAGE—U.K. 1943

RELATIVE AGE DISTRIBUTIONS OF HOSPITAL ADMISSIONS AND MEDICAL DISCHARGES

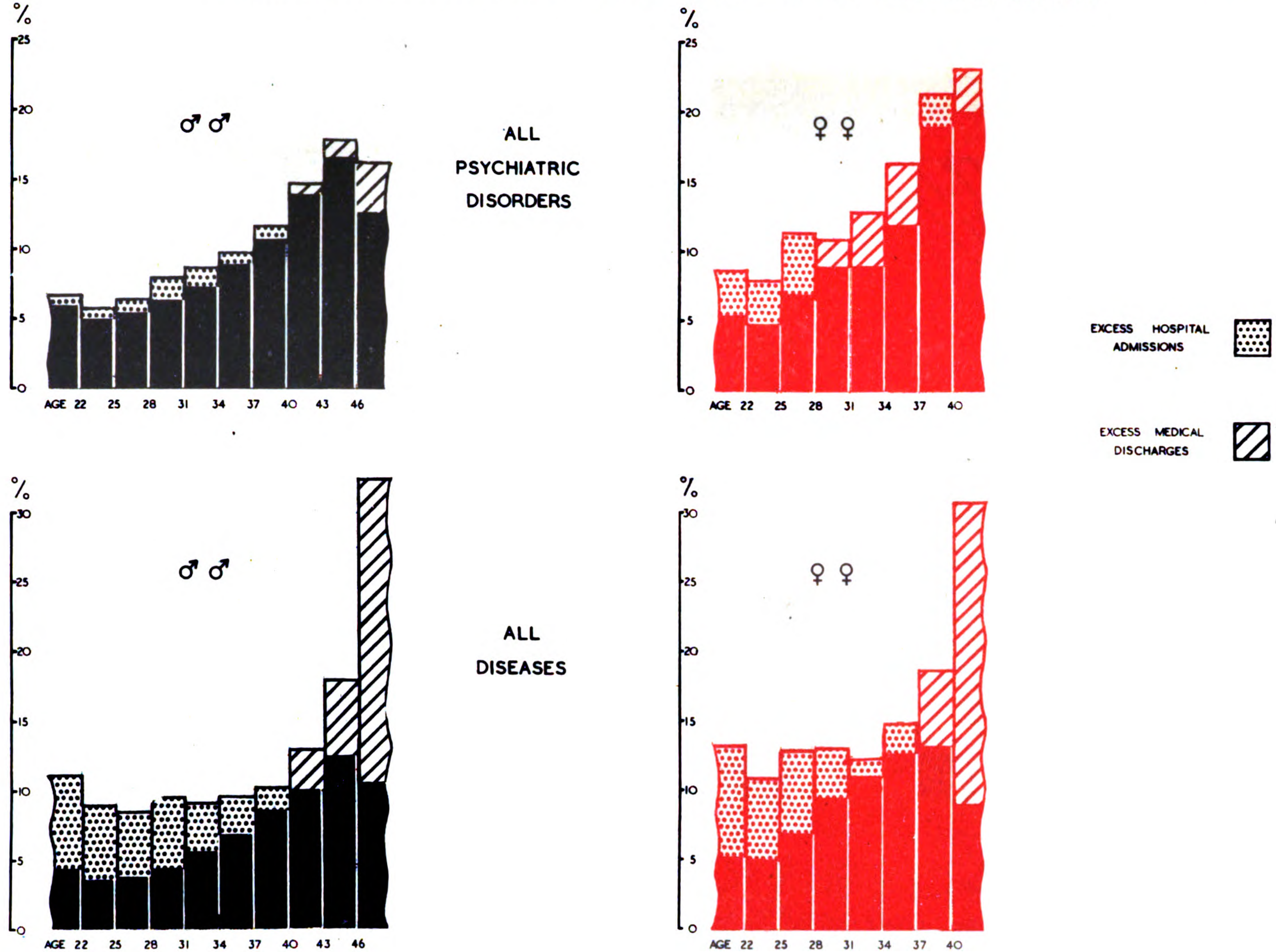


Chart 34

DENTAL CONDITION OF OTHER RANKS IN FIRST HALF OF 1945

PERCENTAGES REQUIRING DIFFERENT AMOUNTS OF TREATMENT

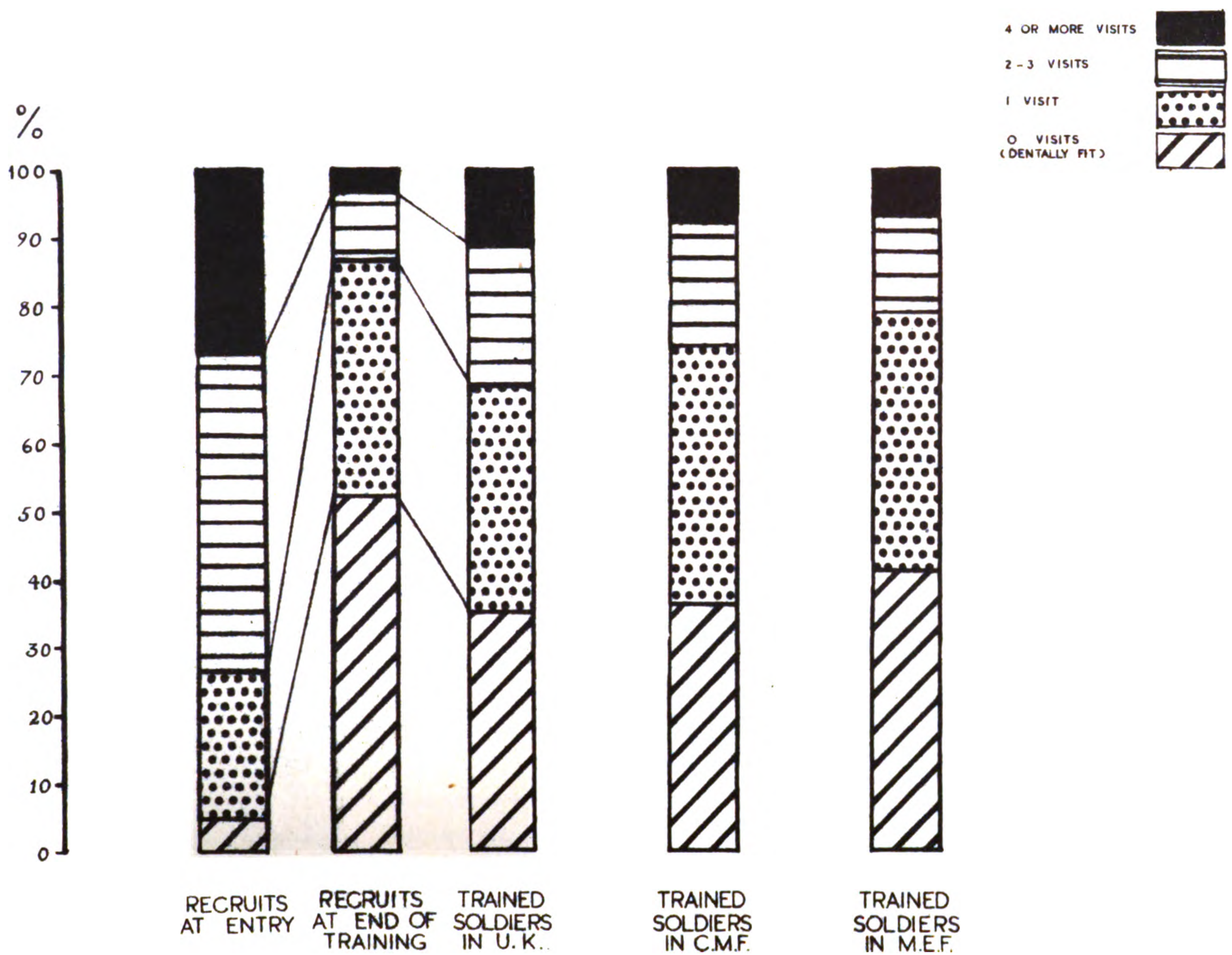


Chart 35

CASUALTIES (INJURED) NORMANDY D-DAY TO END OF JULY, 1944

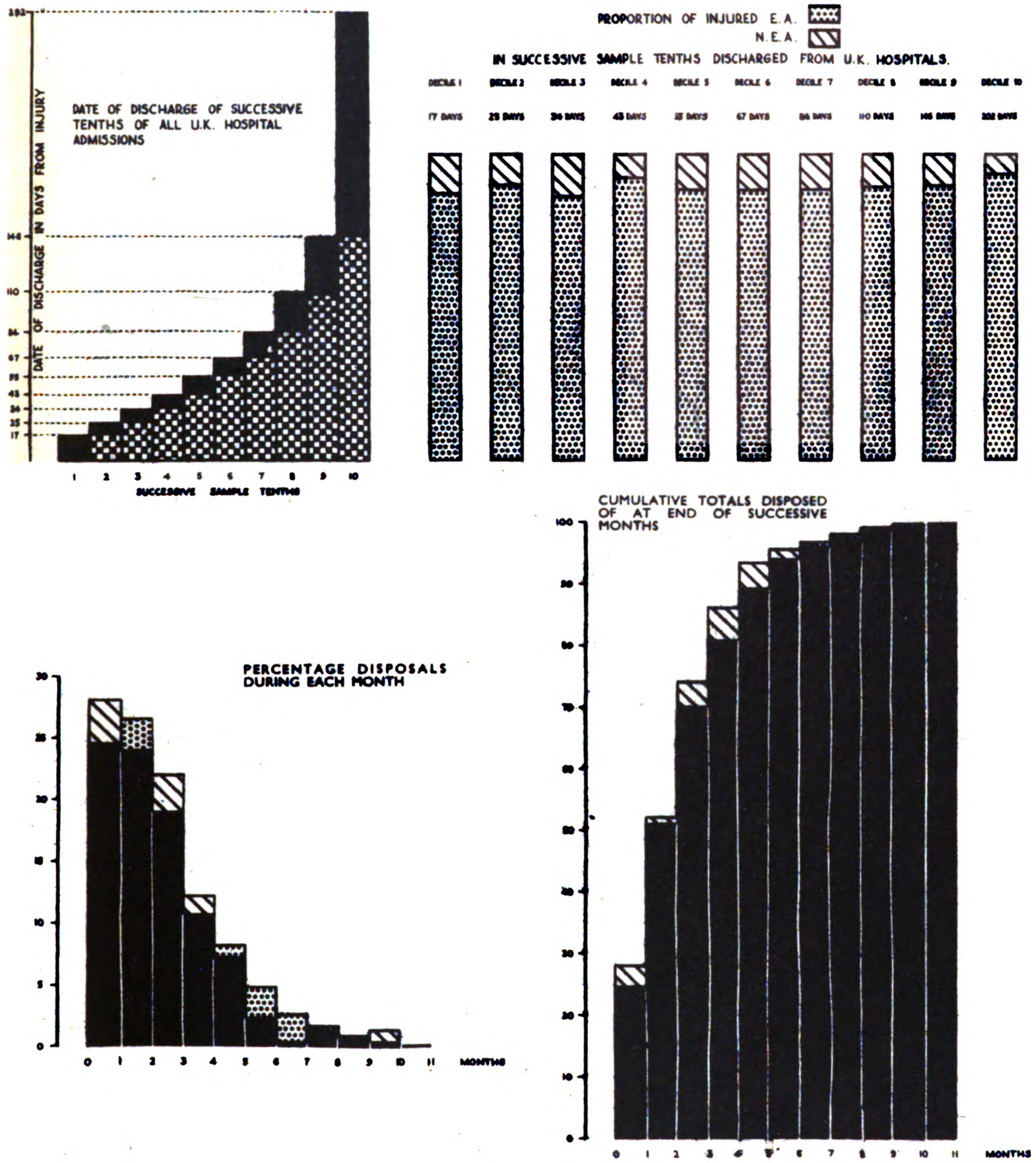
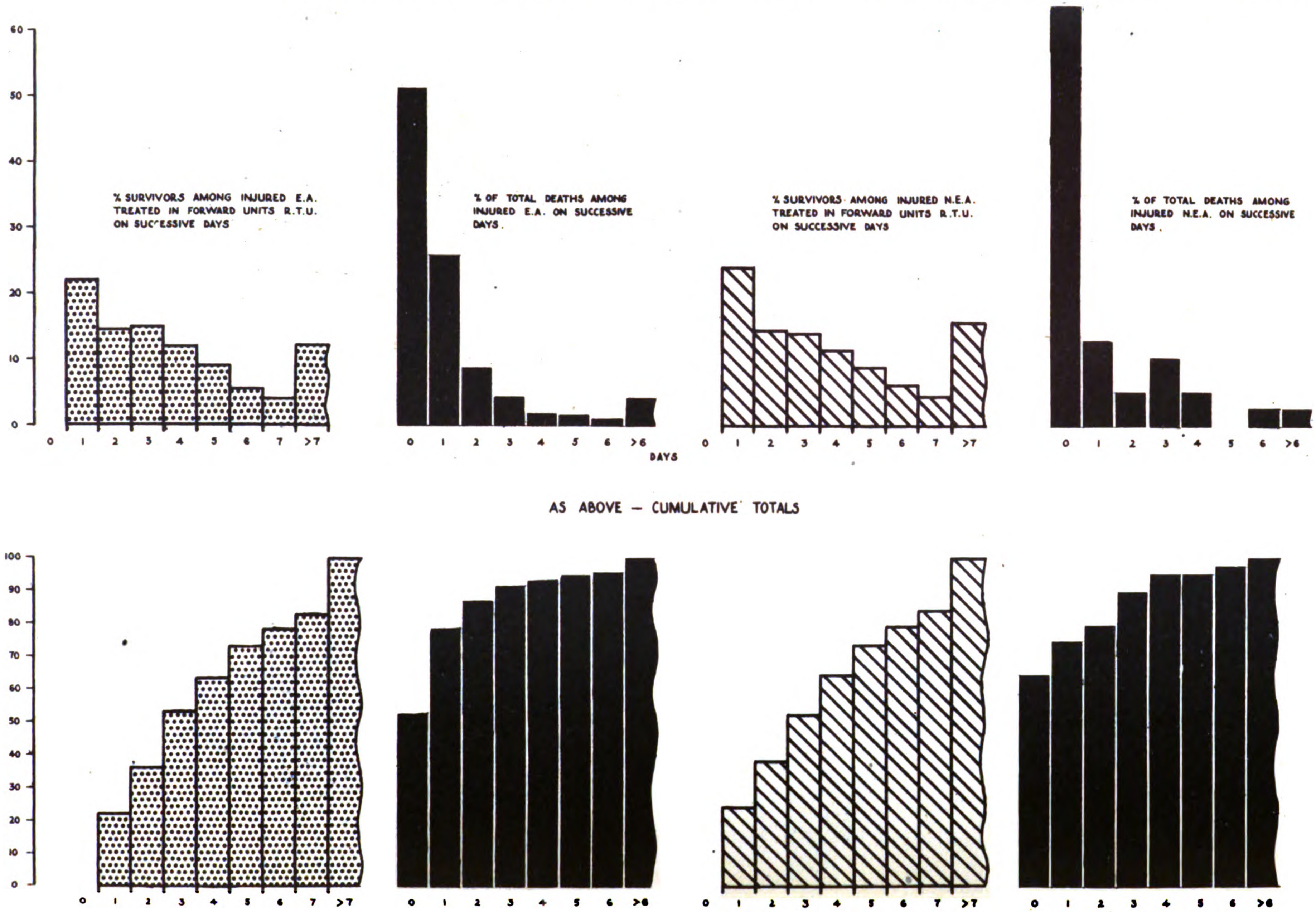


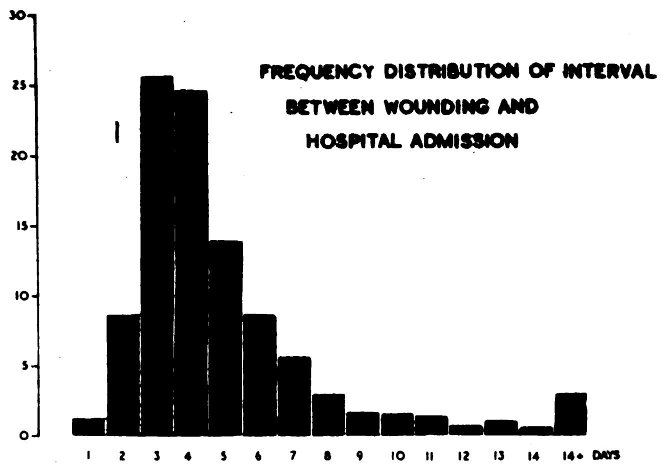
Chart 36

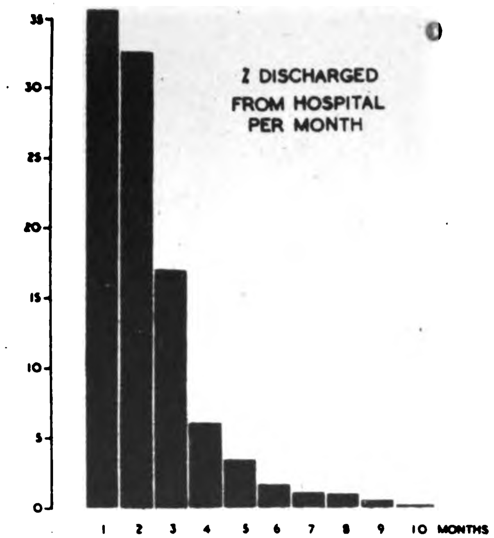
CASUALTIES (INJURED) NORMANDY D-DAY TO END OF JULY, 1944

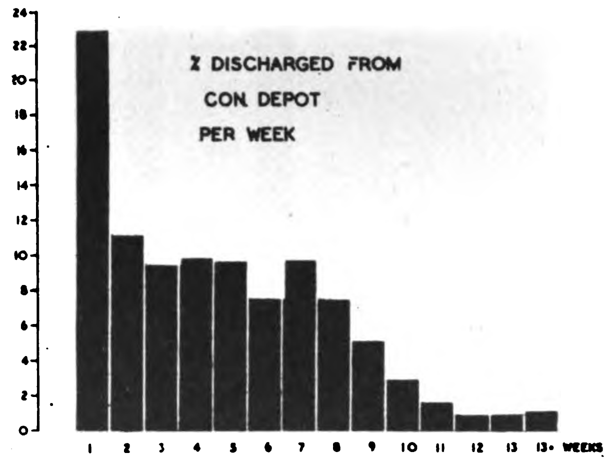


CASUALTIES (INJURED) NORMANDY D-DAY TO END OF JULY, 1944

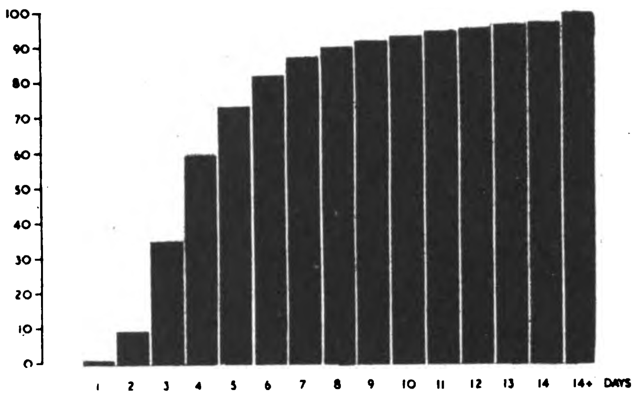
Chart 37

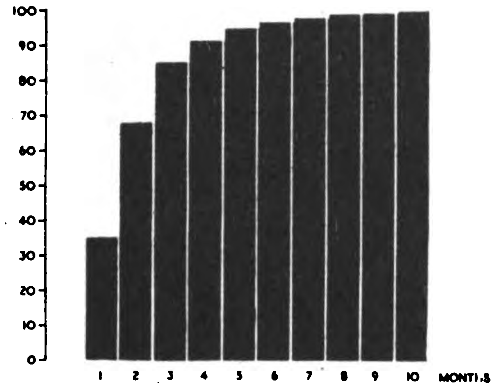


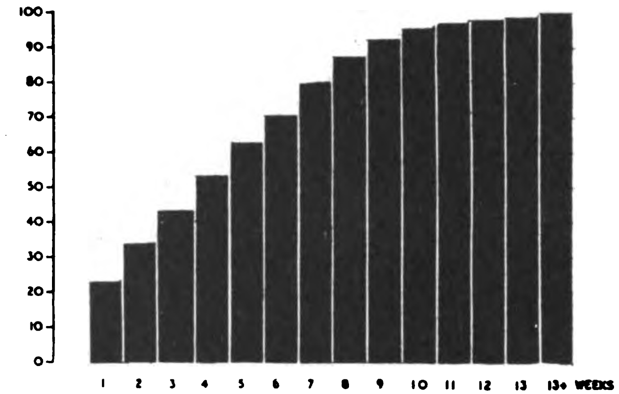




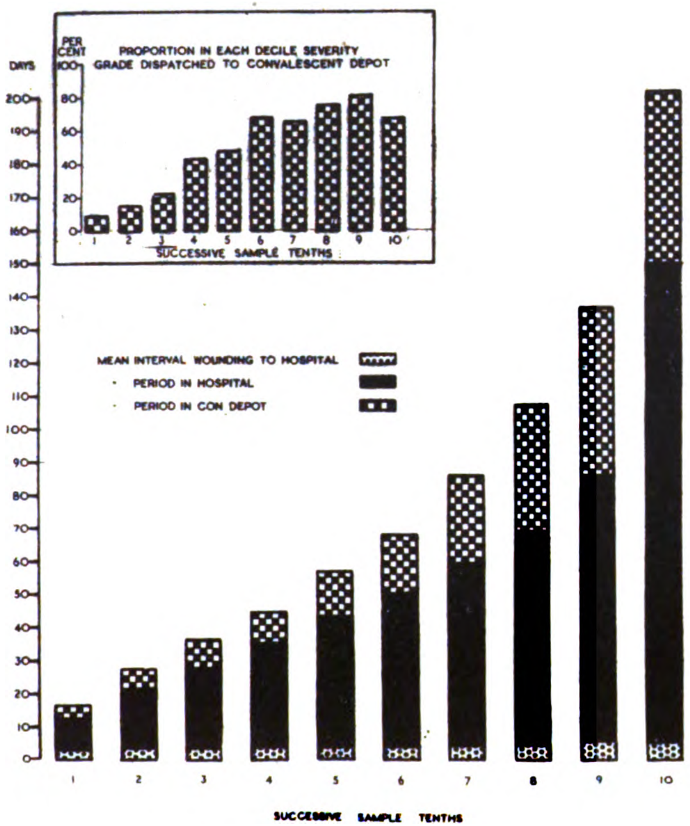
AS ABOVE - CUMULATIVE TOTALS



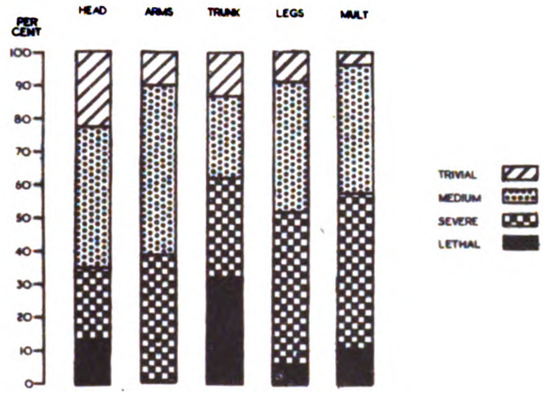




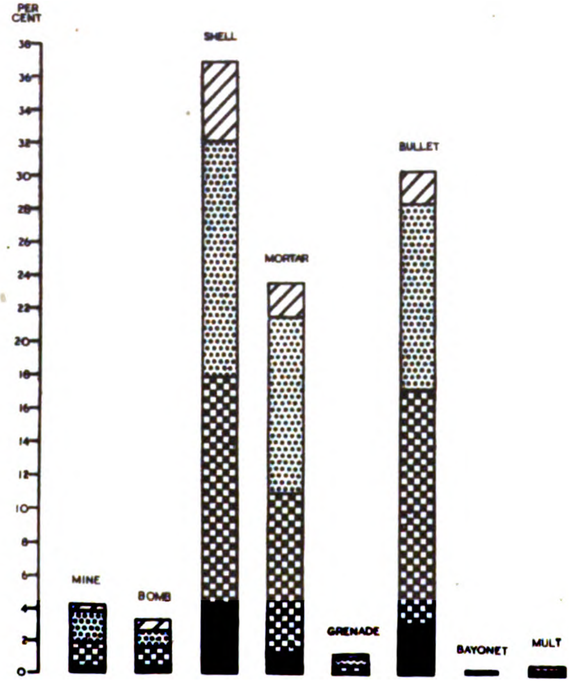
RELATION OF DURATION IN DIFFERENT TYPES OF MEDICAL UNITS TO DECILE SEVERITY GRADES



RELATION OF SITE TO SEVERITY OF WOUND



PROPORTION AND SEVERITY OF TOTAL WOUNDS CAUSED BY DIFFERENT WEAPONS



RELATIONSHIP OF SOURCE TO DISPOSAL OF PSYCHIATRIC CASES IN U.K. MILITARY HOSPITALS

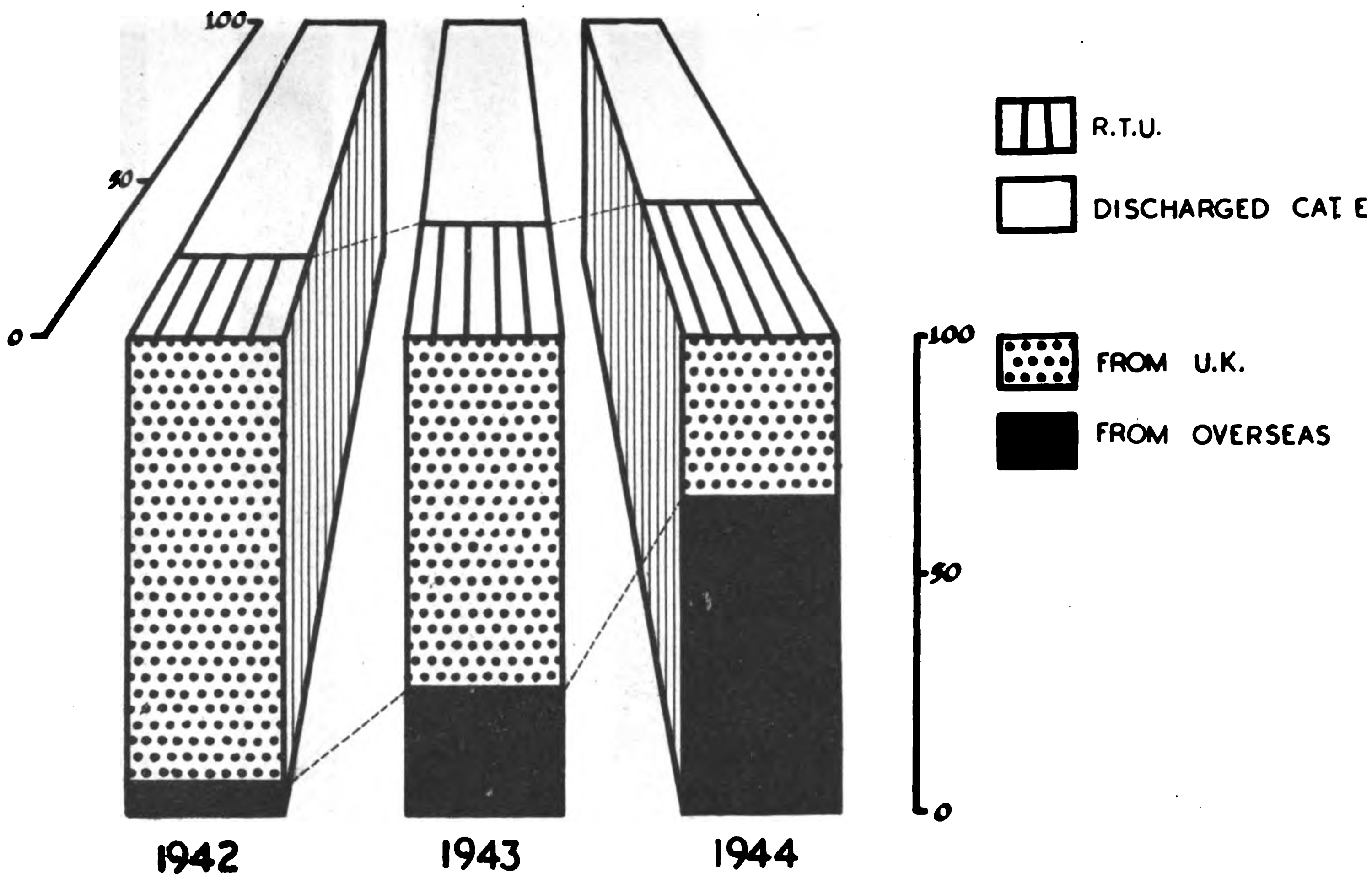


Chart 40

PERCENTAGE DISTRIBUTION OF PSYCHIATRIC CONDITIONS IN OUT PATIENTS (O.Rs.)

JANUARY, 1943 - DECEMBER, 1944

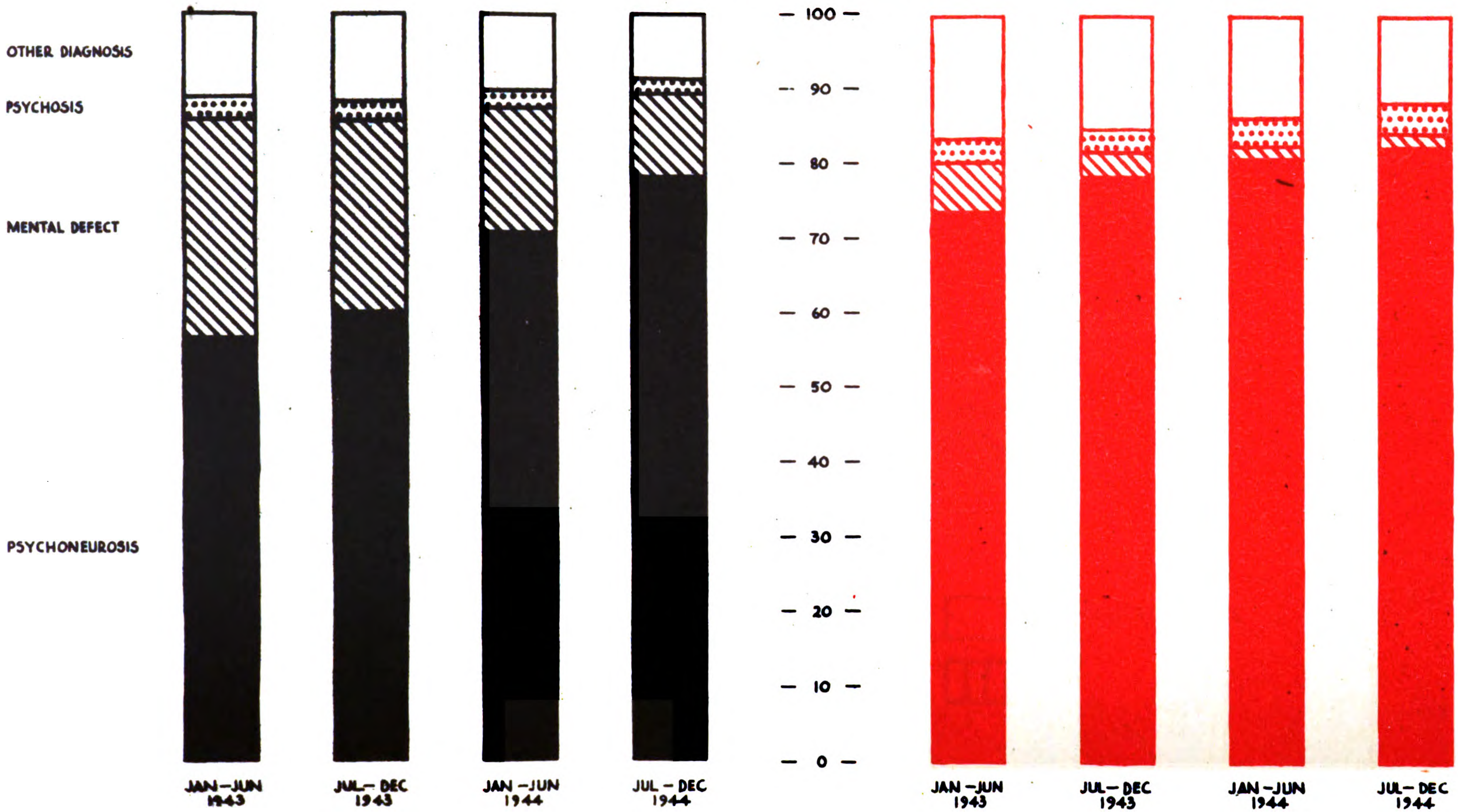


Chart 41

PERCENTAGE DISPOSAL OF PSYCHIATRIC OUT PATIENTS (O.Rs.)

JANUARY, 1943 - DECEMBER, 1944

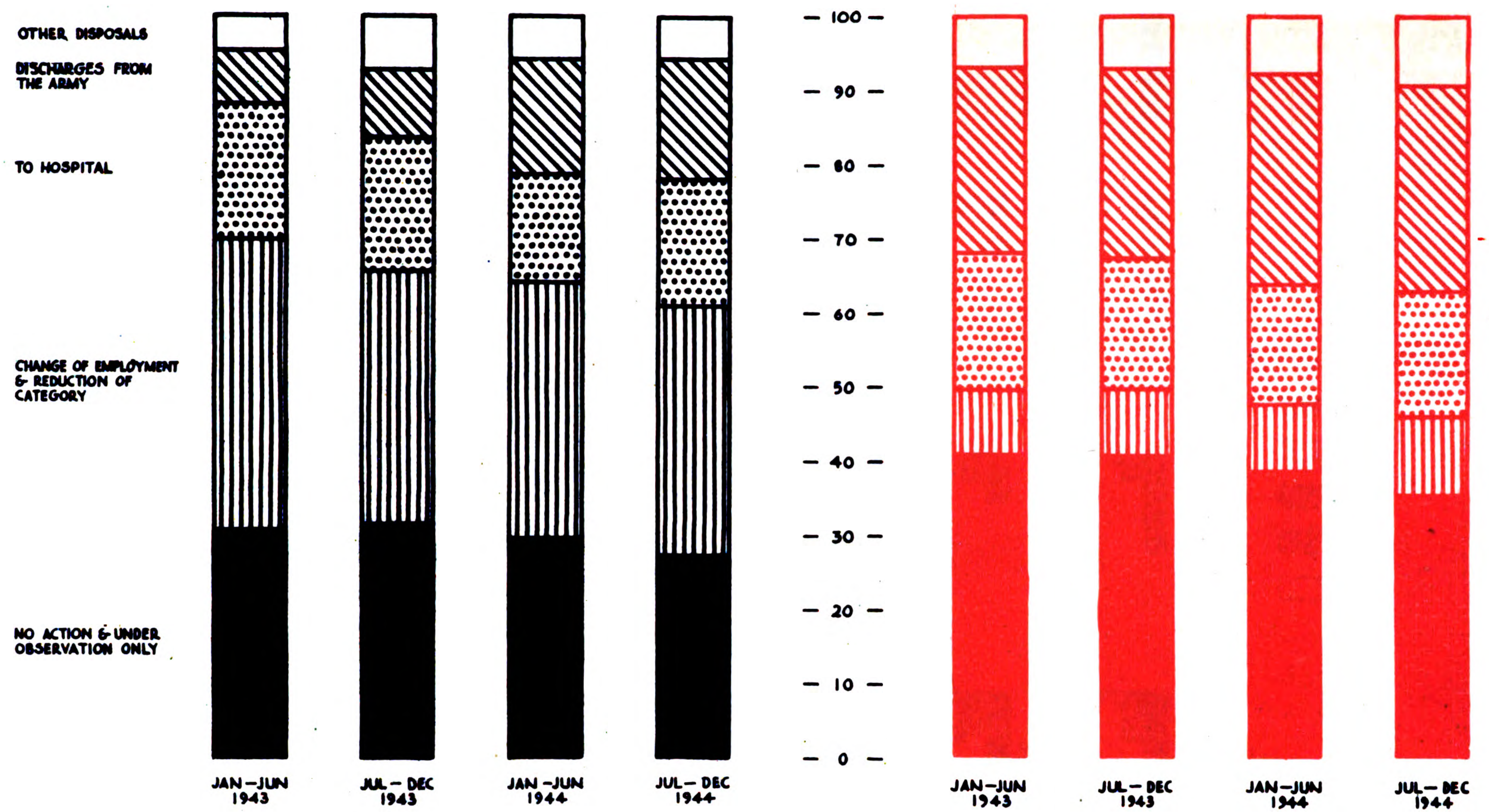


Chart 42

RELATIVE LIABILITY OF INTAKE SELECTION GRADES TO SPECIFIED DISPOSAL ON PSYCHIATRIC RECOMMENDATION

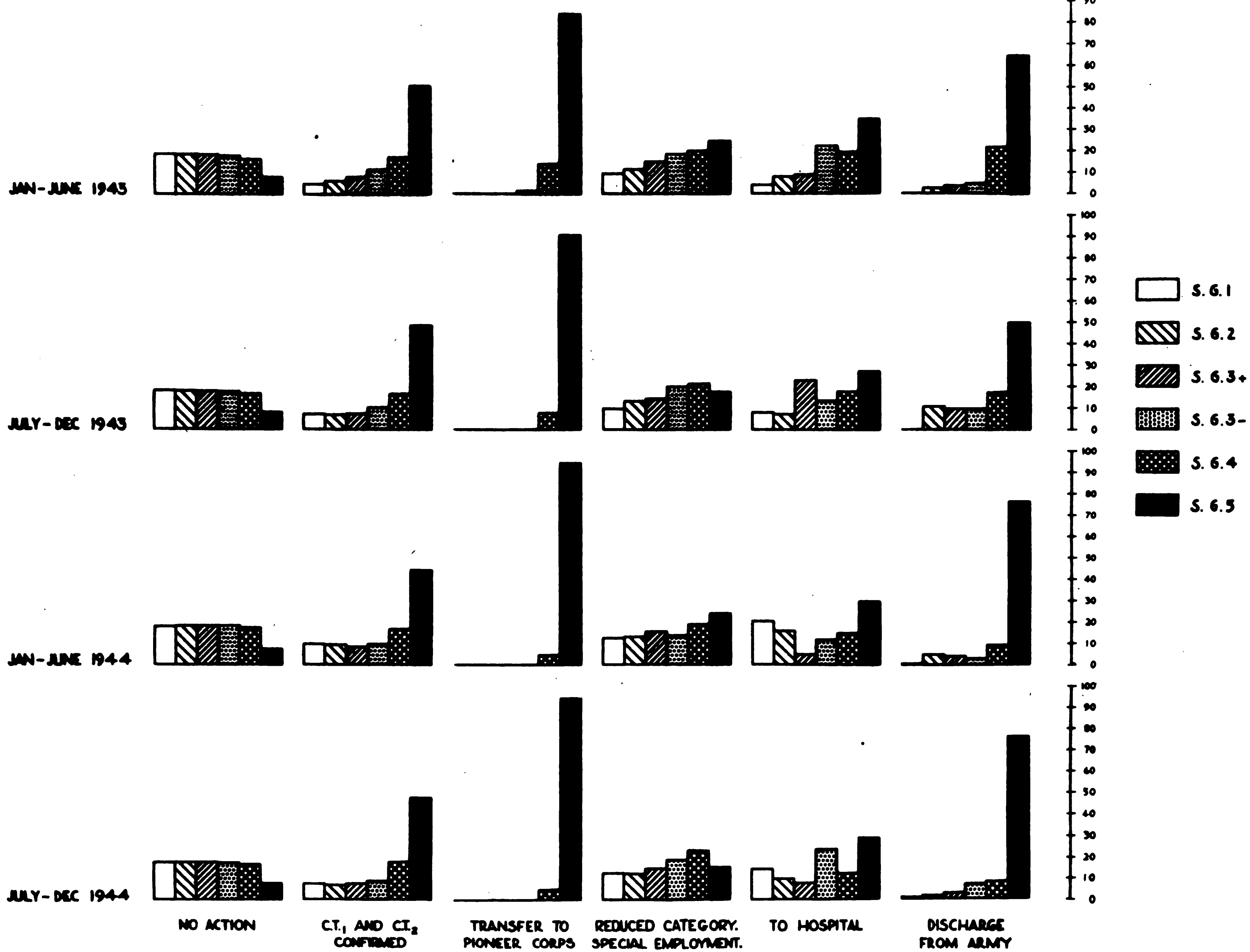
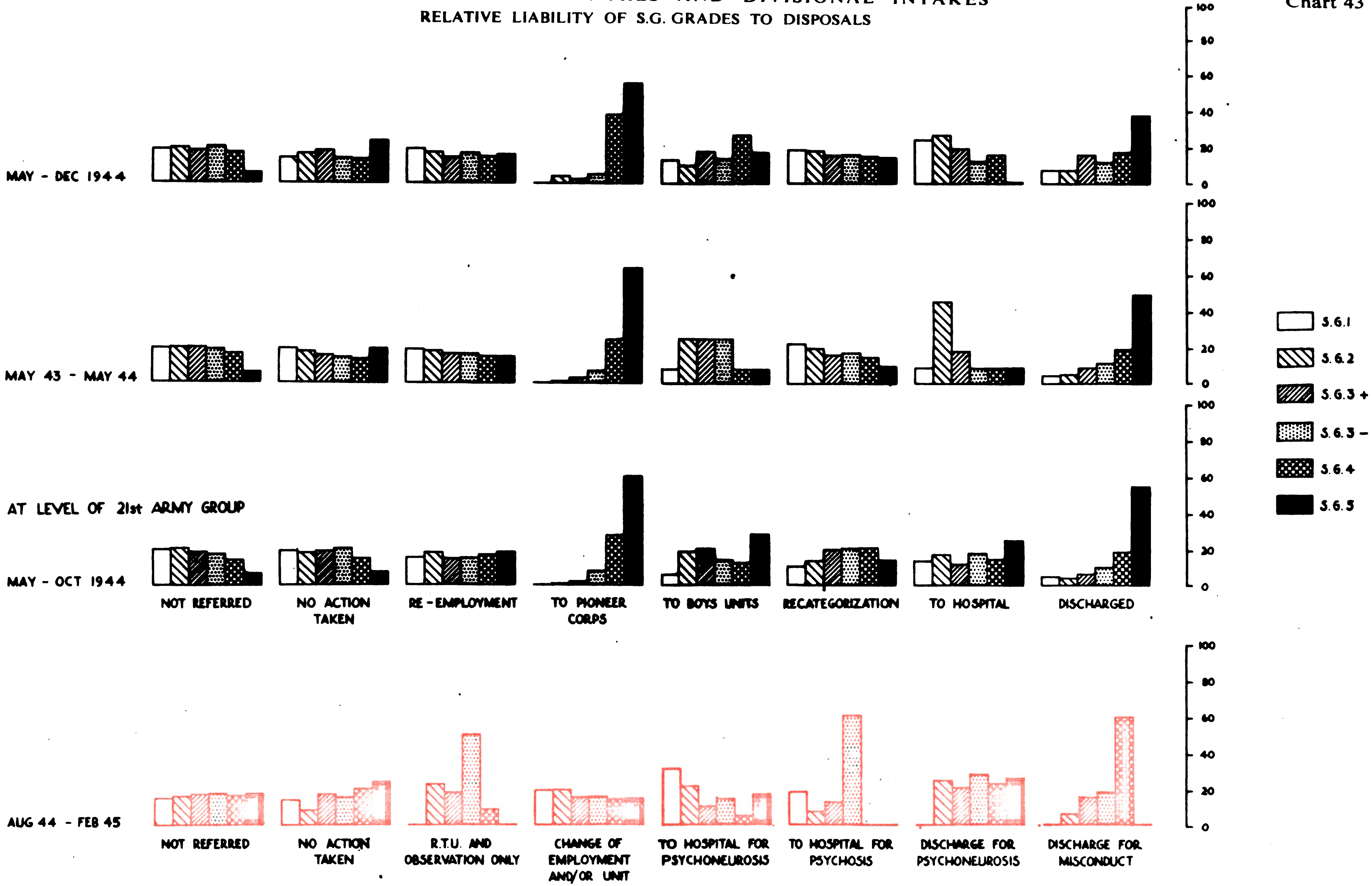


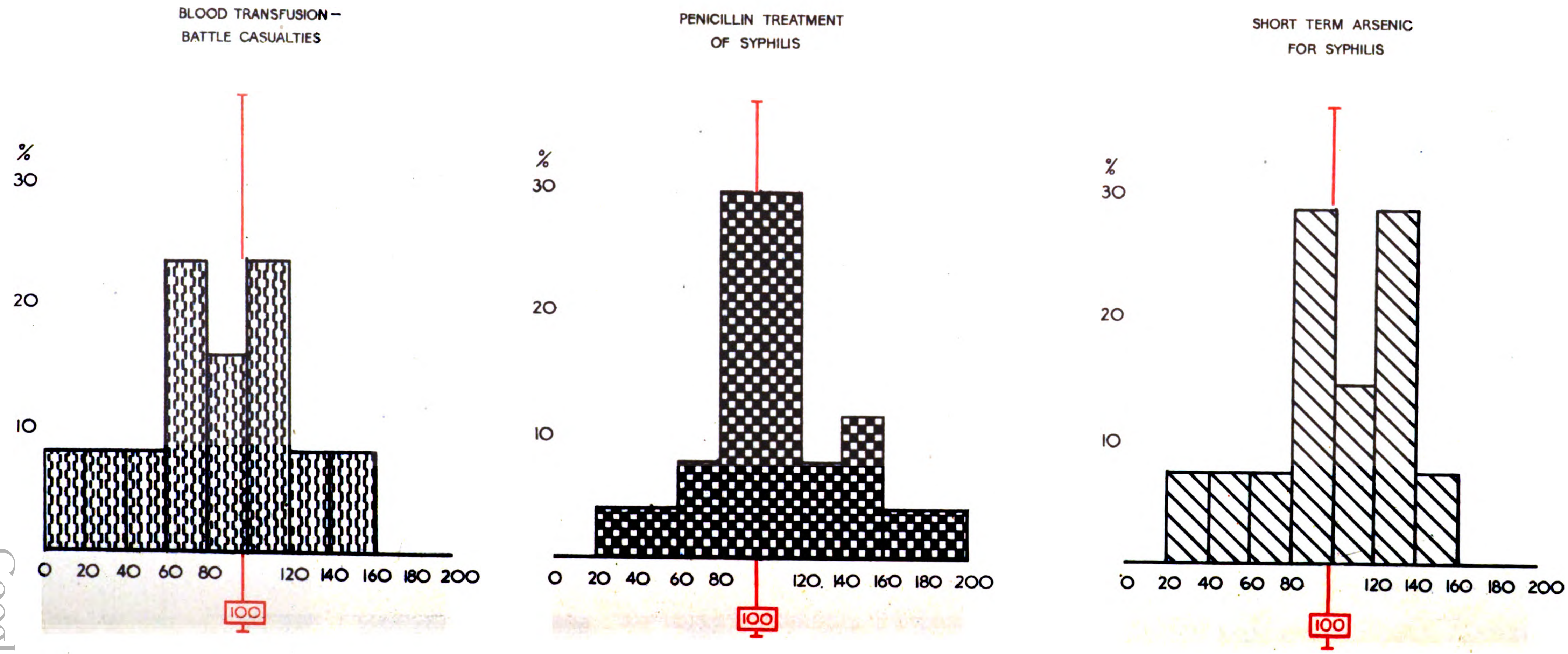
Chart 43

ARMY SELECTION CENTRES AND DIVISIONAL INTAKES

RELATIVE LIABILITY OF S.G. GRADES TO DISPOSALS



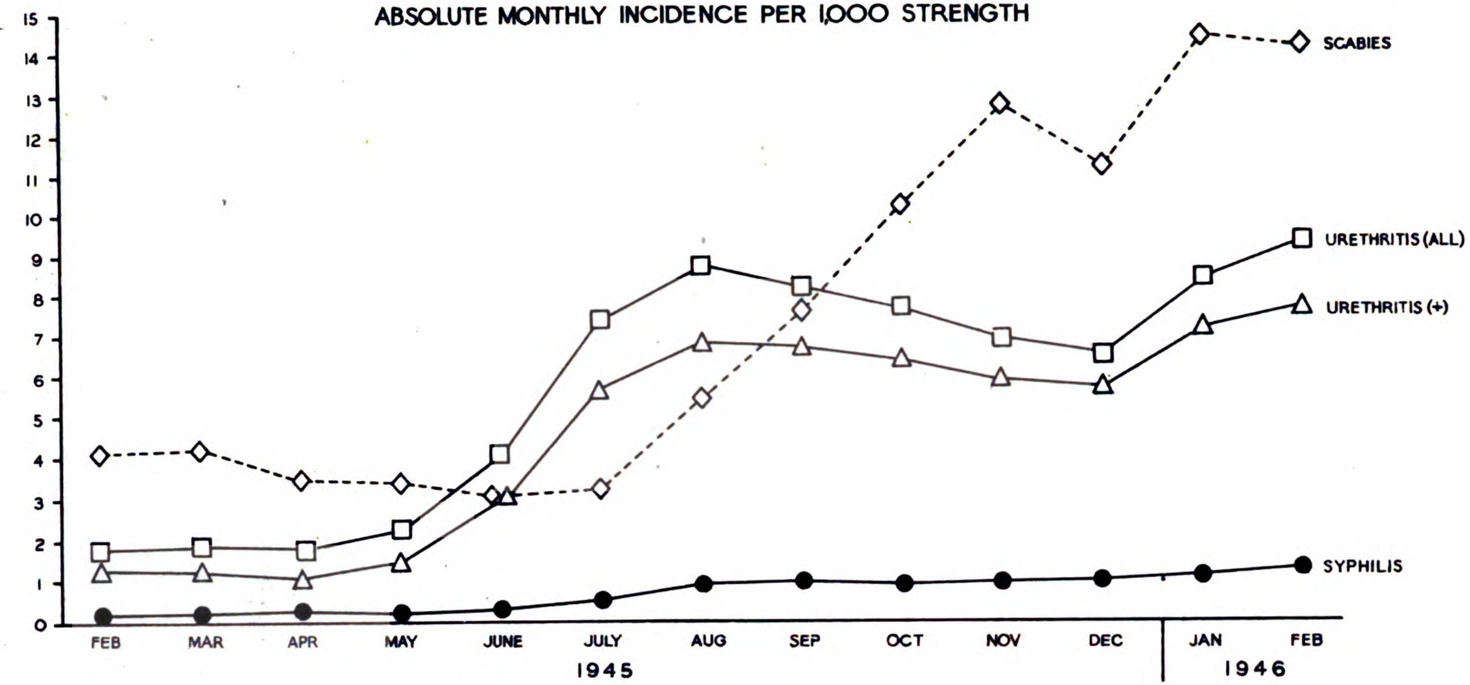
SERUM HEPATITIS—INCUBATION PERIOD (DAYS)



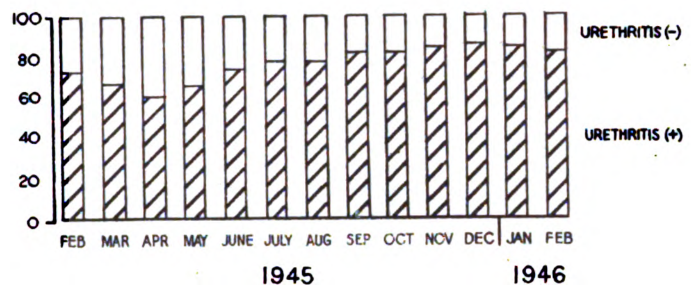
INCIDENCE OF V.D. AND SCABIES AMONG BRITISH TROOPS

BRITISH ARMY OF THE RHINE

ABSOLUTE MONTHLY INCIDENCE PER 1,000 STRENGTH

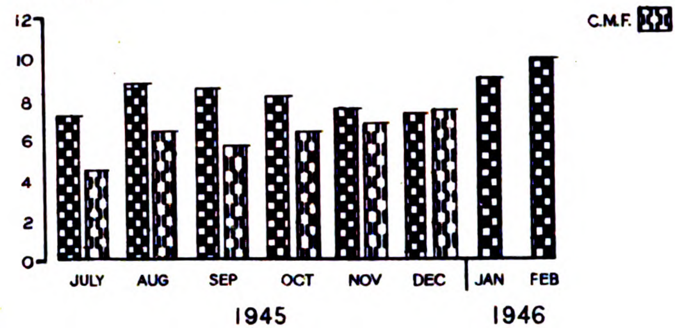


PROPORTION OF URETHRITIS (+) AND URETHRITIS (–)



COMPARISON OF RATES IN B.A.O.R. AND C.M.F.

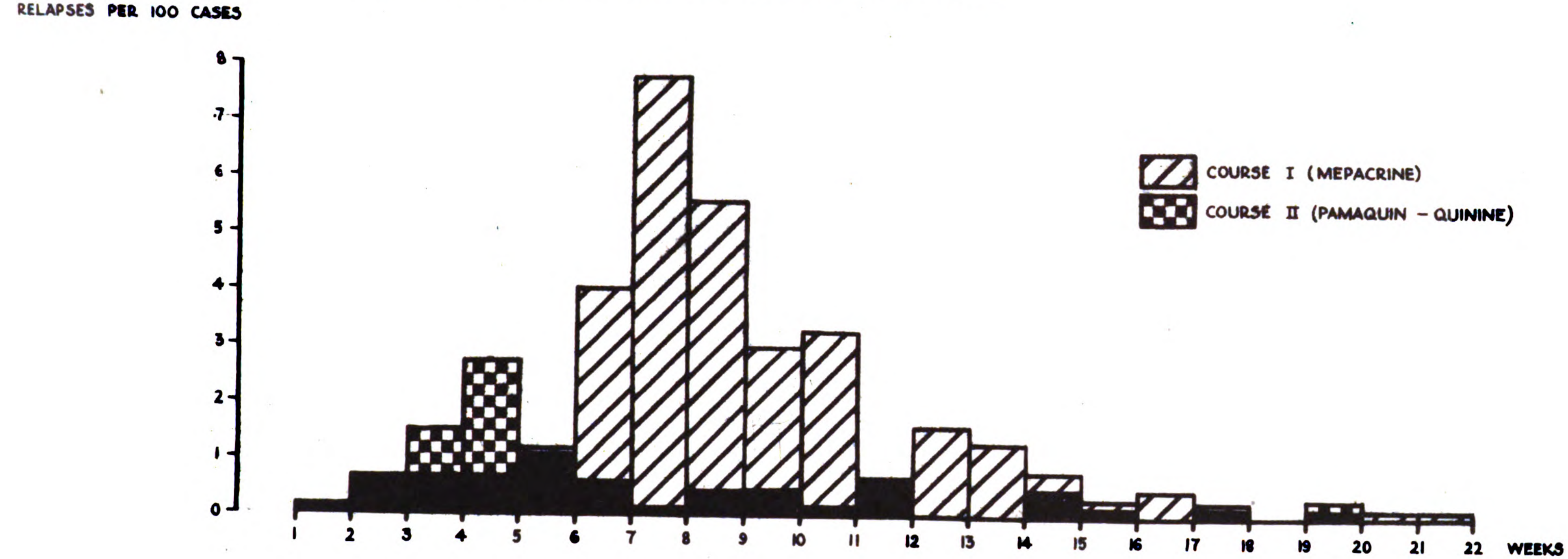
SYPHILIS PLUS GONORRHOEA



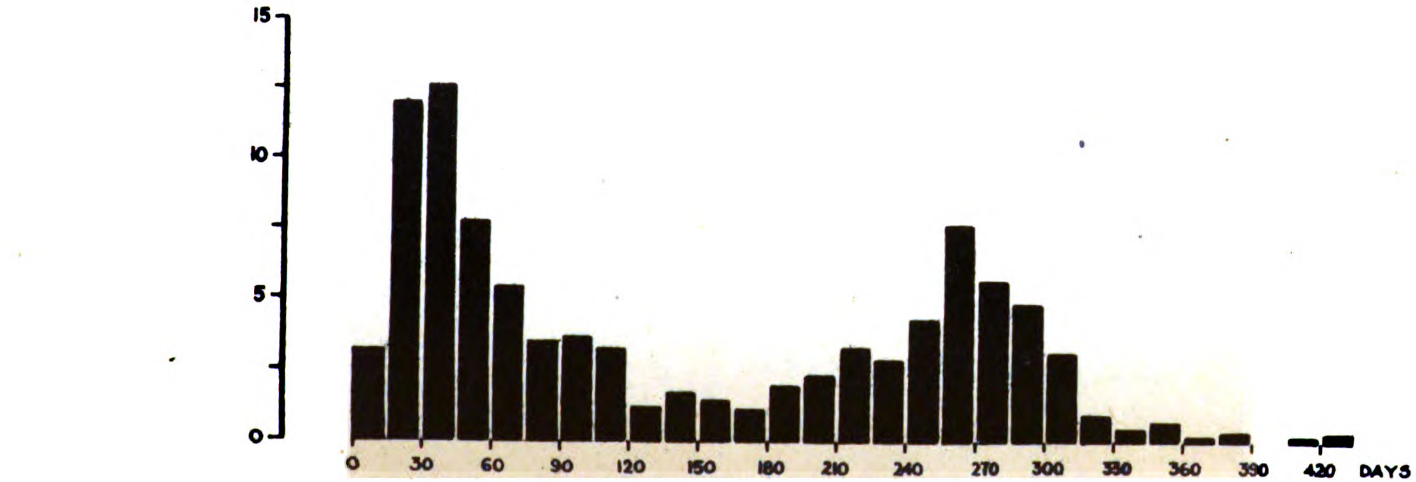
MALARIA RELAPSES AFTER TREATMENT WITH QUININE AND QUININE SUBSTITUTES

Chart 46

SUPERIMPOSED HISTOGRAMS OF MALARIA RELAPSE RATES



HISTOGRAM OF INTERVALS TO LAST PREVIOUS ATTACK



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